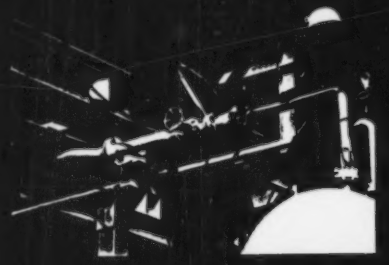
ENERGY FOR OUR FUTURE:
A PLAN FOR BC



DOC
BC
E412
D:E5F8
2002
c.3

LEGISLATIVE LIBRARY OF BRITISH COLUMBIA
3 3298 00258 0976

ENERGY FOR OUR FUTURE: A PLAN FOR BC

Low electricity rates and public ownership of BC Hydro

Secure, reliable supply

More private sector opportunities

Environmental responsibility and no nuclear power sources

103-01549/

MESSAGE FROM THE MINISTER

Energy is a critical part of our daily lives, powering our households, communities and businesses. In B.C., we have abundant, diverse energy resources, including hydroelectricity, oil, gas, coal, coalbed methane and a variety of clean, alternative sources. The time has come to harness their enormous potential to meet our energy needs and generate renewed economic growth and prosperity for all British Columbians.

Energy for Our Future: A Plan for BC is designed to achieve our goal in an environmentally responsible way. It is built around four cornerstones to maximize benefits for British Columbians well into the future. The cornerstones deliver low electricity prices and public ownership of BC Hydro; a secure, reliable supply of energy; more private sector opportunities; and environmental responsibility with a guarantee of no nuclear generation in B.C.

Ultimately, the plan reflects our government's vision of the future for both the energy sector and the province as a whole -- a prosperous future, lively with opportunities for all British Columbians; a dynamic future, in which British Columbia is opened up to its full potential; a certain future, in which British Columbians can move forward with confidence, knowing they live and work in the best place on earth.

Richard Neufeld

LEGISLATIVE LIBRARY
VICTORIA BC V8V ... NOV 27 2002

BRITISH COLUMBIA'S ENERGY RESOURCES

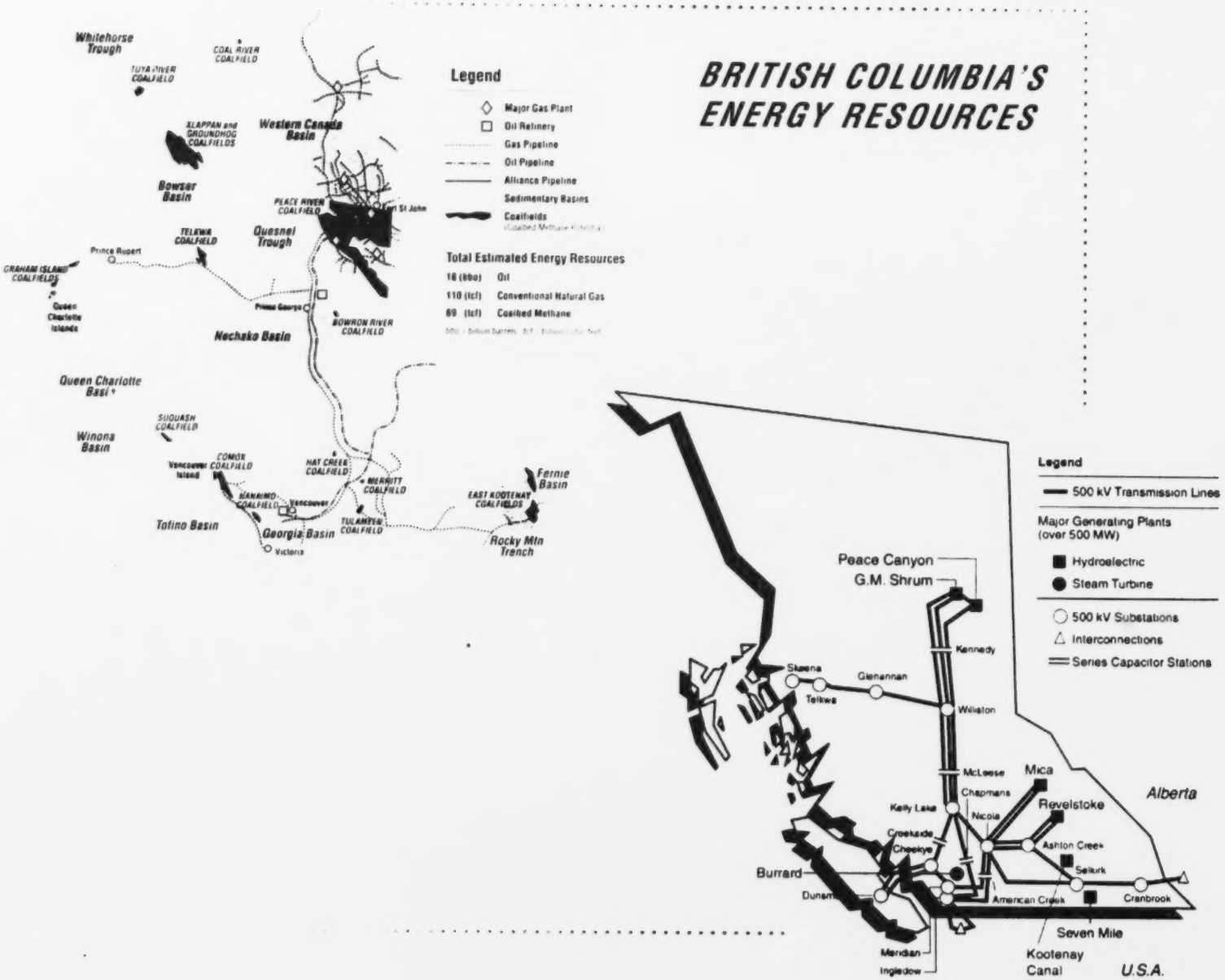
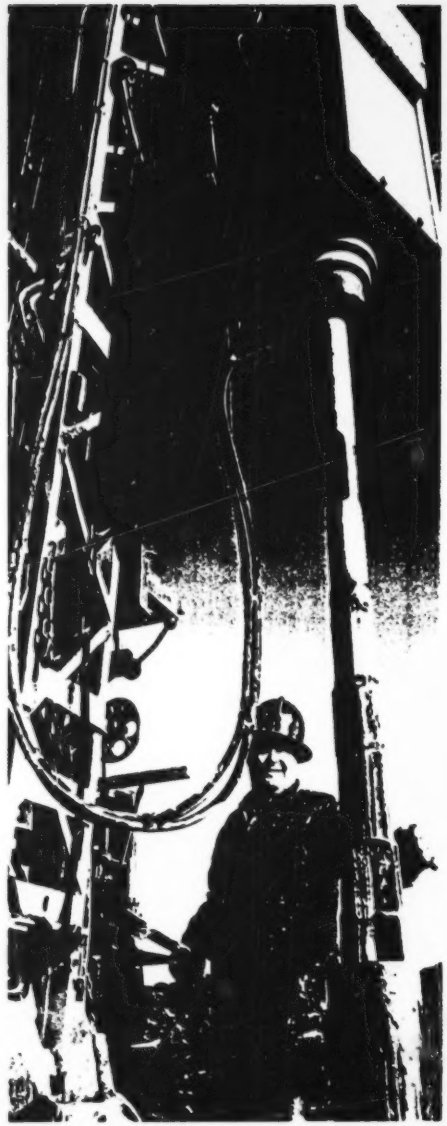
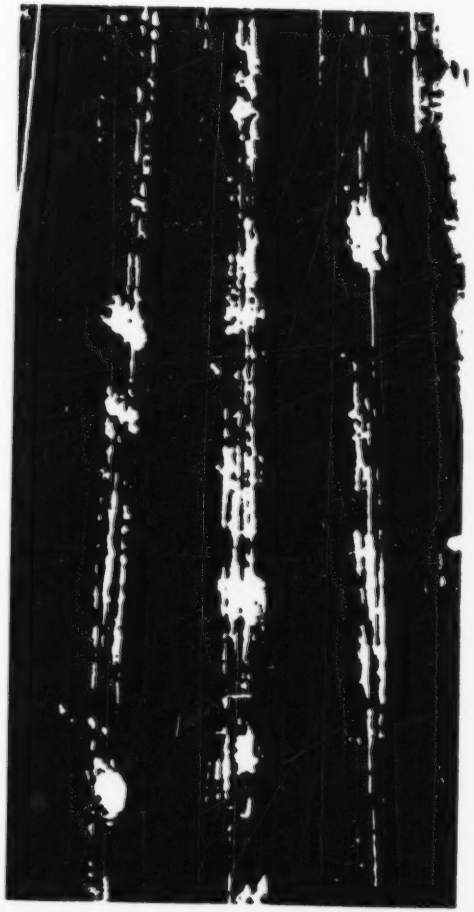


TABLE OF CONTENTS

EXECUTIVE SUMMARY	6
INTRODUCTION	12
BACKGROUND	14
CHALLENGES	18
OPPORTUNITIES	22
SOLUTIONS	26
Low electricity rates and public ownership of BC Hydro	26
Secure, reliable supply	28
More private sector opportunities	30
Environmental responsibility and no nuclear power sources	32
CONCLUSIONS	36
GLOSSARY	40
APPENDIX 1: Comparison of Energy Policy Task Force Recommendations with the Energy for Our Future: A Plan for BC	42
APPENDIX 2: BC Energy Snapshot	48



EXECUTIVE SUMMARY



ENERGY FACT

An average household in BC Hydro's service area uses about 10,000 kWh of electricity per year.

After five decades of dramatic change, British Columbia's energy sector faces new challenges and opportunities.

Our natural gas industry has seen production more than double in the past 10 years. In North America and abroad, electric power markets are being reformed to make them more competitive. With these and other changes, the B.C. energy sector is poised for new investment, increased trade and regional economic growth. To realize its potential, the sector needs an updated plan that will guide its further development over the coming decade.

The purpose of this energy policy, *Energy for Our Future: A Plan for BC,* is to build on B.C.'s strengths to help revitalize the provincial economy and create jobs in an environmentally responsible way.

Energy policy and economic policy are inextricably linked. The Government of British Columbia is committed to restoring a strong and vibrant economy with job creation in all regions of the province. At the same time, a healthy environment is recognized as one of our enduring natural assets. This plan builds on B.C.'s advantages, in particular our abundant energy resources and low electricity prices, with improvements to strengthen the energy sector and provide sustainable economic benefits.

BACKGROUND

Energy drives the economy and makes our modern lifestyle possible.

British Columbians depend on energy to fuel their cars, run their appliances, equipment and industrial plants, and light and heat their homes, communities and businesses. Without a reliable and reasonably priced supply of energy, important industries such as forestry, chemicals, mining and high technology cannot thrive in world markets. The production and delivery of energy is itself a source of economic activity, employing about 35,000 people in 2001, and generating about $2.4 billion in provincial revenues that support health care and other programs. While energy production is focused in the Northeast, Southeast, and on the Columbia River, development opportunities offer the prospect of new investment and jobs throughout the province.

B.C. is becoming increasingly integrated with North American energy markets.

Historically, a strong export orientation has allowed B.C. energy suppliers to take advantage of economies of scale to develop energy resources at lower cost, for the benefit of domestic consumers. Today, B.C. exports two-thirds of the energy it produces, including virtually all of our coal and more than half of our natural gas production. Most of the refined petroleum products (e.g., gasoline and home heating oil) we use comes from Alberta, while imported electricity helps meet provincial needs during periods of below-average water inflows into our hydroelectric reservoirs. The net revenues from energy trade contribute to further energy investment and low electricity rates in the province. Energy exports also play a role in continental energy security by providing clean, reliable energy for consumers in the United States and Alberta.

The province enjoys a number of key energy strengths.

B.C. has extensive reserves of coal, oil, natural gas as well as considerable undeveloped resources of coalbed methane (the gas found in coal seams), hydroelectric and alternative energy, such as small hydro, wood residue, ethanol/biofuels, wind and tidal power. In addition, BC Hydro estimates that in the order of 10 percent of electricity demand could be economically saved by 2015, through greater conservation and efficient energy use. B.C. already benefits from a highly developed energy supply network, with substantial production of coal, natural gas, oil and hydroelectricity. Electricity rates among the lowest in North America are the legacy of large-scale public investment on the Peace and Columbia rivers that was undertaken a generation ago.

CHALLENGES AND OPPORTUNITIES

New energy supplies are required to meet growing demand and support renewed economic growth.

More energy is needed to fuel the growth that will restore B.C. to its position as an economic leader within Canada. Rising energy demands and aging facilities call for major financial investment in plant upgrades and new energy production and delivery facilities. This, in turn, requires better access to energy

resources and the timely, cost-effective development of new supplies. Unless domestic energy sources are developed, British Columbians could find themselves increasingly dependent on imports and vulnerable to price swings. The government, faced with competing fiscal priorities, is looking to the private sector for much-needed energy development.

We have to keep electricity rates down to maintain B.C.'s economic advantage.

BC Hydro rates, frozen since 1996, have not changed or undergone a public review since 1993. With electricity costs rising, the rate freeze must end and BC Hydro rates must be independently regulated by the BC Utilities Commission to keep rate changes to a minimum and remove political interference. At the same time, B.C. will need to adapt to evolving market rules in the United States, if we want to continue earning the export revenues that contribute to our low power rates. These rates give B.C. industry an economic advantage in global markets.

Energy development and use must continue to be environmentally responsible.

A clean, natural environment and energy-efficient facilities and equipment are also important to ensuring our long-term economic advantage. British Columbians are concerned about the environmental impacts from energy development and use. Energy-saving activity that reduces demand and defers the need for new supply is one of the most cost effective strategies for controlling impacts on provincial airsheds and watersheds. Low electricity rates, however, provide a poor price signal for consumers to conserve and invest in energy efficiency. In general, unclear environmental standards and inefficient regulatory processes have hindered environmentally responsible energy development in the province.

The energy sector is well positioned to generate new investment, increased trade and economic growth.

B.C.'s natural resources, talent and homegrown technology offer many diverse opportunities for meeting the changing energy needs of provincial consumers. Efforts are underway to make domestic electricity service even more reliable in support of technology industries and the new information economy. The outlook for increased energy trade is favourable, given growing US demands, especially for natural gas in power generation. Here at home, the private sector has demonstrated its ability to develop the smaller-scale generation (e.g., small hydro and efficient natural gas turbines) that can locate close to load, avoid transmission losses and infrastructure costs, and provide regional economic benefits. To enable investment in the oil and gas sector, land use and pre-tenure planning, road upgrading and cooperation with First Nations are improving access to resources for exploration and development in the Northeast.

Low cost hydroelectricity and efficient regulation can help preserve our electricity rate advantage.

While other jurisdictions struggle under large power debts and high electricity prices, B.C. benefits from W.A.C. Bennett's vision of the hydroelectric system developed in the 1960s and 1970s on the Peace and Columbia rivers. These heritage assets have an inherent value given by the difference between their current cost of production and what it would cost to replace this power in the marketplace. There are ways to secure the benefits of existing low-cost generation for B.C. consumers. Furthermore, performance-based regulation and negotiated settlements can be used to regulate BC Hydro rates efficiently and encourage cost savings, so that future rate changes will be minimized.

Aggressive energy saving and alternative energy development can better manage environmental impacts.

For more than a decade, the province's energy utilities, private energy service companies and individual consumers have accumulated expertise in reducing energy use through conservation and energy efficiency. It is possible to design electricity rates to give consumers the right signals for this energy saving activity. We can also develop our alternative energy resources to provide power that is less harmful to the environment than conventional (large hydro, coal-fired and natural gas-fired) generation. Other countries have adopted portfolio standards requiring a portion of electricity supply to come from technologies that have a low impact on the environment.

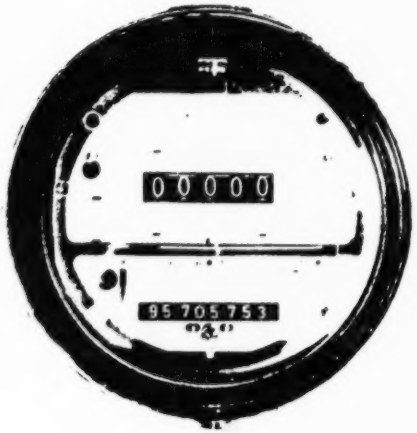
The energy sector is well positioned to generate new investment, increased trade and economic growth.

Low electricity rates and public ownership of BC Hydro

Secure, reliable supply

More private sector opportunities

Environmental responsibility and no nuclear power sources



SOLUTIONS

The four cornerstones of *Energy for Our Future: A Plan for BC* are low electricity rates and public ownership of BC Hydro; secure, reliable supply; more private sector opportunities; and environmental responsibility and no nuclear power sources.

B.C.'s low-cost electricity will remain an important economic advantage during the next decade. Stable and dependable energy supplies will be vital not only to sustain our other resource industries, but also to grow the technology sector. Private developers, including independent power producers, will be key partners in the province's energy future. We will build on one of North America's best environmental records with efficient regulation that holds energy producers and consumers accountable for their impacts.

Low electricity rates will be assured by entrenching the benefits of publicly owned assets, independently regulating BC Hydro rates and outsourcing services where economic.

BC Hydro ratepayers will benefit from a legislated heritage contract that locks in the value of existing low-cost generation (heritage energy), and from the continued use of trading revenues to supplement domestic revenues. The BC Utilities Commission will conduct an inquiry and recommend the terms and conditions of the heritage contract legislation. To benefit ratepayers and taxpayers alike, public ownership of BC Hydro generation, transmission and distibution assets will continue. The delivery of services will be outsourced where costs can be reduced for consumers while maintaining quality of service. The rate freeze will end on March 31, 2003 and the BC Utilities Commission will hold a revenue requirement hearing by the end of 2003/04 to review BC Hydro costs. Future rate changes will then be determined using performance-based regulation and negotiated settlements.

To promote secure and dependable energy, reliability standards will be maintained, new supplies will be developed and the BC Utilities Commission will be strengthened.

BC Hydro will continue to establish separate lines of business for generation, transmission and distribution. Distribution will acquire new power on a least-cost basis, subject to regulatory

Policy Actions that support low electricity rates and public ownership of BC Hydro:

#1	A legislated heritage contract will preserve the benefits of BC Hydro's existing generation.
#2	BC Hydro ratepayers will continue to benefit from electricity trade.
#3	Public ownership of BC Hydro generation, transmission and distribution assets will continue.
#4	BC Hydro will outsource the delivery of services where costs can be reduced for electricity consumers while maintaining quality of service.
#5	The BC Utilities Commission will once again regulate BC Hydro rates.
#9	Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.
#13	The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.
#15	The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.
#16	The BC Utilities Commission will determine the terms and rates for this new transmission entity.
#21	New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.
#22	The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings.
#23	The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

oversight. As part of this process, it will obtain heritage energy from the generation business at a rate to be determined by the BC Utilities Commission. The commission's structure and mandate will be strengthened to support the re-regulation of BC Hydro and the efficient regulation of other utilities.

To encourage new resources, the government will develop requirements for exploring and developing coalbed methane and other unconventional hydrocarbon resources. In general, energy reliability will be maintained and improved through well-functioning natural gas markets and coordinated electricity planning.

A dedicated provincial offshore oil and gas team will develop a provincial position, work with the federal government and move effectively toward development of offshore oil and gas resources.

Before offshore development can proceed, further issues need to be resolved such as an agreement between the federal and provincial governments on an overall management regime, including regulatory, royalty and environmental requirements. The Province will also need to work with coastal communities and First Nations to ensure that benefits accrue to the areas where activity occurs.

A dedicated provincial offshore oil and gas team will develop a provincial position, work with coastal communities, First Nations and the federal government and move effectively toward development of the offshore oil and gas resources.

Policy Actions that support secure reliable supply:

#1 A legislated heritage contract will preserve the benefits of BC Hydro's existing generation.

#6 The Vancouver Island Generation Project will be reviewed to determine if it is the most cost-effective means to reliably meet Island power needs.

#7 High reliability and energy security will be maintained through well-functioning natural gas markets and coordinated electricity planning.

#8 BC Hydro distribution will operate as a separate line of business from generation.

#9 Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.

#10 Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic growth.

#11 The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to develop a provincial position, work with the federal government and move effectively toward development of the offshore resources.

#12 The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other energy distributors, will be strengthened.

#13 The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.

#15 The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.

#18 Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.

#19 Natural gas marketers will be allowed to sell directly to small volume customers, and will be licensed to provide consumer protection.

#21 New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.

#22 The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings.

#23 The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

Industry invested $5.1 billion in B.C.'s petroleum and natural gas industries, a 46 % increase over 2000.

The publicly owned BC Hydro Transmission Corporation will operate BC Hydro's transmission system to ensure fair access for all generators

To increase opportunities for the private sector, independent power will be developed and ongoing support will be provided for the oil and gas industry.

Independent power producers (IPPs) will develop new generation, with BC Hydro's role limited to undertaking efficiency improvements at existing facilities. A separate entity, BC Hydro Transmission Corporation, will operate BC Hydro's publicly owned transmission system, to ensure fair access for all generators. Under a new BC Hydro rate structure, IPPs will be able to serve a portion or all of the electricity needs of large customers. Similarly, natural gas marketers will be free to sell directly to residential and small commercial natural gas consumers. These and other ongoing government initiatives in the oil and gas sector (e.g., royalty reform, pre-tenure planning and public-private partnerships for road upgrades) will support private investment and economic opportunities across the province.

Policy Actions that support more private sector opportunities:

#4	BC Hydro will outsource the delivery of services where costs can be reduced for electricity consumers while maintaining quality of service.
#9	Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.
#10	Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic growth.
#11	The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to develop a provincial position, work with the federal government and move effectively toward development of offshore resources.
#13	The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.
#14	Under new rates, large electricity consumers will be able to choose a supplier other than the local distributor.
#15	The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.
#17	The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years.
#18	Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.
#19	Natural gas marketers will be allowed to sell directly to small volume customers, and will be licensed to provide consumer protection.
#25	Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.
#26	To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.

Environmental responsibility will be assured through a clean energy goal, new price signals for conservation, clear emission standards and other strategies.

Electricity distributors will pursue a voluntary goal to purchase at least 50 percent of their new power supply from BC Clean resources that are renewable or result in a net environmental improvement over existing generation. New rate structures (stepped and time-of-use rates) will give better signals for energy saving activity. The government will also expand and update its Energy Efficiency Act and regulations, and will change utility regulatory practices to remove a disincentive to energy efficiency investments by utilities. The Ministries of Energy and Mines and Water, Land and Air Protection are working together on strategies to address climate change and air quality in sensitive airsheds. In other areas, provincial processes for environmental assessment, water licensing and waste permitting are being streamlined. To allow a fair evaluation of

the role of coal-fired generation in B.C.'s electricity future, the Province will adopt emission guidelines for coal-fired power plants that will allow B.C. to compete for investment with neighbouring jurisdictions.

Energy consumers, private investors and B.C. communities will all benefit from the plan, as it is implemented over the next two years.

Energy for Our Future: A Plan for BC will be fully implemented by 2004. B.C. consumers will enjoy low electricity rates, greater choice among energy suppliers and potential savings in their electricity and natural gas bills. Private investors will be able to better access and develop new energy resources, while communities will reap the benefits of economic development and local environmental improvement. Taken together, the plan's 26 actions will make the energy sector more resilient and flexible for future changes that will serve British Columbians' interests.

Energy for Our Future: A Plan for BC will be fully implemented by 2004.

Policy Actions that support environmental responsibility:

#13 The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.

#20 Electricity distributors will pursue a voluntary goal to acquire 50 percent of new supply from BC Clean Electricity over the next 10 years.

#21 New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.

#22 The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings.

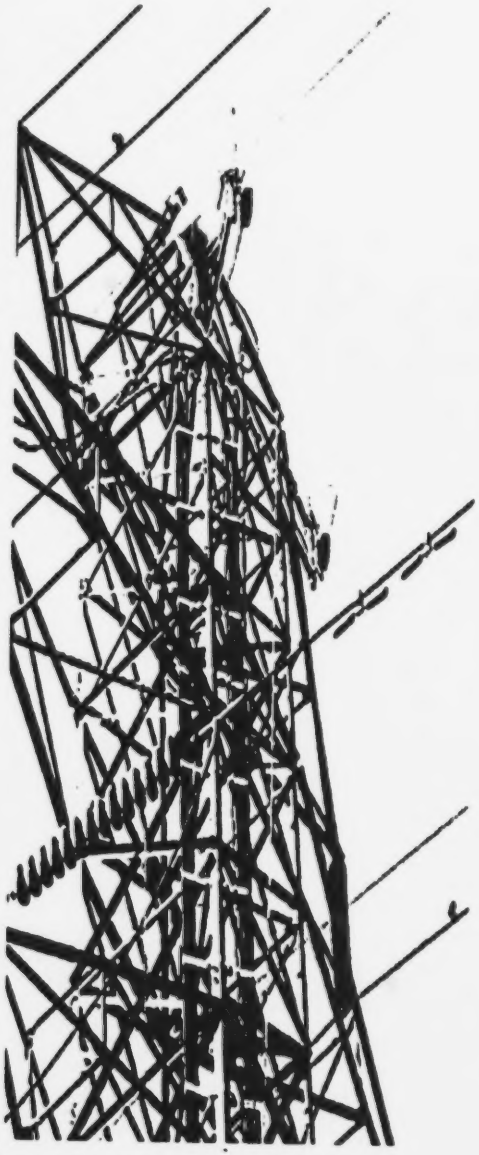
#23 The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

#24 The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.

#25 Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.

#26 To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.

INTRODUCTION



British Columbia's energy sector encompasses all the people, facilities and equipment involved in energy production, delivery and consumption. The sector has been transformed over the past half century. Today, new challenges and opportunities call for an updated energy policy that will support renewed economic growth in the province.

A LOOK BACK

B.C.'s energy sector has changed dramatically during the past 50 years, with public investment in electric power and private development of oil, natural gas and coal resources.

In the early 1950s, energy and the provincial economy looked very different. The energy sector was focused on serving a small domestic resource economy. Energy was supplied by localized monopolies and power rates were relatively high. The next four decades saw tremendous change, from large-scale hydroelectric development on the Peace and Columbia rivers and the construction of major pipelines to expanding oil and gas production in the Northeast, to deregulation of natural gas markets and the emergence of independent power producers. Today, B.C. enjoys a more diversified economy, an extensive network of energy supply facilities, low electricity rates and the benefits of a more competitive, export-oriented energy sector.

Provincial energy policy has evolved along with these changes.

In 1980, the Province of British Columbia released its first energy policy. An *Energy Secure British Columbia* sought to manage energy resources for a secure supply, reduce oil imports and conserve resources. Direct government intervention in energy markets, from setting natural gas prices to building hydroelectric facilities, was the dominant policy direction. At the same time, the BC Utilities Commission was created to provide independent oversight of energy utilities.

The 1980s witnessed a shift from government intervention to market determination of oil and gas prices. In 1985, natural gas markets were opened up and the federal government relinquished control of petroleum markets. A second policy statement, *New Directions for the 1990s*, appeared in 1990, with two new priorities - efficient energy and clean energy; and two left over from the previous decade - secure energy and energy for the economy. The objectives of this policy were to make markets more competitive, send better price signals to consumers, encourage cleaner fuels and energy efficiency and strengthen environmental standards.

Two investigations in the mid-1990s looked at reforming the B.C. electricity market to make it more competitive.

At the request of Lieutenant Governor in Council, the BC Utilities Commission undertook an Electricity Market Structure Review in 1994/95. This review found that the driving forces for electricity reform, in particular high prices, did not exist in B.C. The Commission's report recommended that B.C. move forward with increased competition at the wholesale level (e.g., private power producers selling to BC Hydro) and real-time pricing, which allows large power users to obtain their additional electricity requirements at market prices.[1]

In 1997, a BC Task Force on Electricity Reform was unable to agree on the components of market reform for the province. The head of the task force, Dr. Mark Jaccard, subsequently presented his own proposal for phased electricity reform.[2] Dr. Jaccard's suggestions included establishing an independent grid operator to improve (wholesale) access for competitive suppliers to BC Hydro's transmission system, allowing non-utility suppliers to sell directly to industrial customers (limited retail access), and setting a portfolio standard to require that a percentage of power generation come from environmentally desirable technologies.

Since the release of these reports, some of their suggested reforms have been implemented, including wholesale transmission access, real-time pricing for large BC Hydro customers and retail access for Aquila Networks Canada (formerly West Kootenay Power) industrial customers. Others, such as the independent grid operator and portfolio standard, were not acted upon.

In August 2001, Premier Gordon Campbell commissioned the Task Force on Energy Policy to provide recommendations to government.

After producing an interim report[3] in November 2001, the task force consulted with stakeholders and the public. A final report[4] was submitted to the Minister of Energy and Mines on March 15, 2002, with 46 recommendations in the areas of conservation and energy efficiency, alternative energy, electricity, oil and natural gas, coal and regulation. These recommendations support a series of policy directions that include developing new energy supplies, making markets more competitive, reforming the electricity industry, ensuring sound environmental decisions and harmonizing government regulations. Appendix 1 lists the recommendations in full and provides a government response in each case.

THE PATH FORWARD

B.C.'s new *Energy for Our Future: A Plan for BC* builds on these past efforts with a strategic path for the energy sector.

Energy policy and economic policy are inextricably linked. The government is committed to restoring a strong and vibrant provincial economy with employment opportunities for British Columbians. At the same time, a healthy environment is recognized as one of B.C.'s important natural assets. The purpose of this new policy is therefore to build on the province's energy strengths, in particular our abundant natural resources and low electricity prices, to help revitalize the economy and create jobs in an environmentally responsible way.

There are four cornerstones of B.C.'s plan:

Low electricity rates and public ownership of BC Hydro. Low-cost electricity will be an enduring economic advantage during the next decade. Legislation will entrench the benefits of our publicly owned hydroelectric power assets, and will ensure efficient regulation to keep rates low, maintain industry competitiveness, and support economic growth.

Secure, reliable supply. Stable and dependable energy supplies are increasingly vital in the move to an information economy. To sustain our resource industries and expand the technology sector, energy reliability will be improved and energy markets will be diversified, with more sources of supply, greater competition in electricity generation and enhanced customer choice.

More private sector opportunities. The private sector will be a key partner in the province's energy future. New investment in private power production and continued high activity levels in the oil and gas industry will be critical to realize our full potential as a leading energy supplier in North America.

Environmental responsibility and no nuclear power sources. B.C. has a history of environmentally responsible energy development and one of the best environmental records on the continent. We continue to reject nuclear power and will build on our clean energy strengths with incentives for alternative energy development, new rate signals to encourage energy saving and aggressive strategies for conservation and energy efficiency.

This plan outlines actions the government will take, or has already initiated, to achieve these four objectives.

The plan begins by providing some background on energy production and use in B.C. It then describes several challenges and opportunities currently facing the energy sector. Next, a series of policy actions are outlined in support of the four cornerstones above. The statement ends with a summary of the implications of these policies for consumers, producers, and other participants in the sector. Readers should note that the plan does not address energy use in transportation, which is being dealt with separately through the BC Climate Change Plan and other initiatives underway.

3 British Columbia Utilities Commission, *The British Columbia Electricity Market Review: Report and Recommendations to the Lieutenant Governor in Council*, September 1999.

2 Dr. Mark Jaccard, *Reforming British Columbia's Electricity Market: A Major Review and Final Report of the British Columbia Task Force on Electricity Market Reform*, January, 1998.

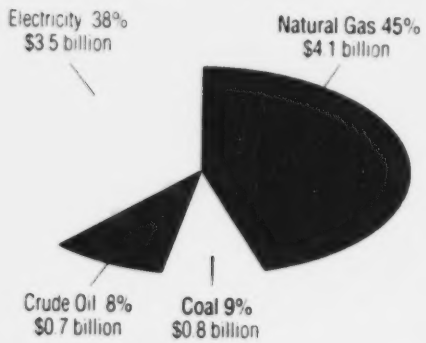
3 Task Force on Energy Policy, *Strategic Considerations and Key Issues for British Columbia Energy Policy: Interim Report*, November 2001.

4 Task Force on Energy Policy, *Strategic Considerations and Key Issues for British Columbia Energy Policy: Final Report*, March 2002.

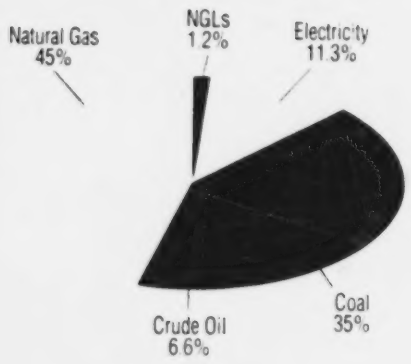
A typical large office building (20-25 stories) will consume 3.5 GWh of electricity per year, equal to the consumption of 350 households.

BACKGROUND

VALUE OF BC ENERGY PRODUCTION - 2000
$9.1 billion total



BC PRIMARY ENERGY PRODUCTION - 2000



Energy is a necessity for and a key driver of B.C.'s economy and quality of life. It contributes to the international trade that is responsible for most of the economic benefits in which we all share. Energy markets continue to evolve with pressures for change in the electricity industry. Appendix 2 provides an overview of the B.C. energy sector.

THE IMPORTANCE OF ENERGY

Energy fuels our daily lives.

British Columbians rely on energy to power their cars, run their appliances, equipment and industrial plants, and light and heat their homes, communities and businesses. Perhaps nowhere is the importance of energy more evident than in the case of electric power. Whereas 20 years ago the average home had relatively few appliances, today it has a computer, two TVs, a dishwasher, microwave oven, VCR and DVD player, among other items. New technologies such as high resolution TVs can consume significantly more energy. Likewise, the typical office is now equipped with computers, photocopiers, fax machines and other electricity-using equipment.

Energy also drives the provincial economy.

Energy is a significant input into the production of other resource commodities. The energy-intensive sectors of forest products, mining, refining, and chemicals together make up 70 percent of provincial exports. These sectors, facing tough competition in the global marketplace, must control costs and increase efficiency and productivity to maintain their economic advantage.

Access to reliable, low-cost energy is also important for attracting and developing the technology sector in B.C. Technology firms are particularly dependent on a continuous supply of electricity, as shown by California's recent energy crisis. The Silicon Valley Manufacturing Group has estimated that its almost 200 members lost more than $100 million during one day of rolling blackouts in June 2000.[5]

The energy sector itself is a major source of economic activity.

The sector as a whole (electricity, natural gas, oil and coal) employs about 35,000 people. Energy accounts for about four percent of provincial gross domestic product, the value of our economy's output.

Revenues to energy industries totaled $9.1 billion in 2000, and direct revenues to government exceeded $3 billion. The oil and gas industry, at $1.8 billion in 2000, is B.C.'s largest source of natural resource revenues that help to fund health care and education. In 2001/02, lower prices resulted in a decline of $650 million to the Province. Dividends, water rentals, and taxes from BC Hydro yield in the order of $700 million annually. Aside from its employment and revenue benefits, energy contributes to regional development, primarily in the Northeast and Southeast, but increasingly with opportunities across the province.

THE ROLE OF TRADE

An export orientation has allowed energy resources to be developed at lower cost for British Columbians.

British Columbia currently exports two-thirds of the energy it produces. Much of today's network of energy production and delivery facilities would not exist had resources been developed only to serve provincial consumers. Examples include an extensive hydroelectric system on the Peace and Columbia rivers, the Duke Energy (formerly Westcoast Energy) pipeline bringing natural gas to Vancouver, and natural gas drilling in the Northeast. A strong export orientation has allowed the energy sector to take advantage of economies of scale and develop resources at lower cost. This, in turn, has resulted in reliable and reasonably priced energy service for B.C. consumers.

Electricity trade helps ensure low power rates and reliability for domestic consumers.

The province's flexible hydroelectric system, with its large reservoirs for storing water, enables highly beneficial trade in electricity. BC Hydro earns revenues by importing electricity when market prices are low and exporting electricity when prices are high, while at all times satisfying domestic power needs. The net revenues from this trade help keep provincial rates low and stable.

Imports also help meet electricity requirements during times of reduced water inflows into B.C. reservoirs. BC Hydro can earn significant trading income even in low water years, when the province is a net importer, because of the flexibility of our large hydroelectric and reservoir systems. Net trading revenue averaged around $100 million annually during the 1990s.

Our clean energy exports contribute to continental energy security.

B.C.'s hydro-based electricity exports offer a source of clean, reliable power for consumers in the United States and Alberta. In US markets, our natural gas displaces oil and coal used to generate electricity. With growing North American demand, especially for natural gas used in power plants, B.C. has a key role to play in supporting continental energy security. Continued integration with regional power markets will provide better access to reliable, low-cost electricity for our export customers and provincial consumers alike.

B.C.'S ENERGY STRENGTHS

We have extensive undeveloped energy resources for new supply and a significant potential to further reduce energy use.

Discovered reserves of natural gas are sufficient to meet domestic and export needs for the next decade. Undiscovered reserves of natural gas, including coalbed methane, could add decades of new supply, but will require further exploration to be realized. Coal resources, if used for electricity production at B.C.'s current electricity consumption rate, could last well over a century

While there are considerable resources remaining for large hydroelectric development, many are on protected rivers. The potential for other renewable electricity, including small hydro, wood residue, wind and tidal energy, is growing over time as technologies improve and costs decline. In total, new conventional (available large hydro, natural gas-fired and coal-fired) and alternative energy resources are currently estimated at more than double existing generating capacity. In addition, BC Hydro estimates that 10 percent of total electricity demand could be economically saved by 2015, through increased conservation and energy efficiency.

Biofuel technologies are under development to convert plant material such as agricultural products and wood waste into ethanol and other transportation fuels. B.C. has enough wood residue to produce over 300 million litres of ethanol annually. Ethanol is blended with gasoline and diesel fuel to add oxygenation, extend conventional fuel supplies and reduce transportation-related emissions.

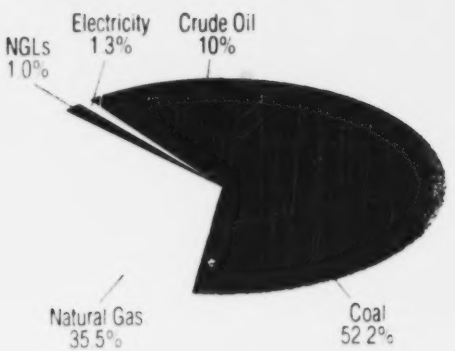
A diverse, reliable energy supply network has evolved in the province.

The energy sector is large and diverse. It comprises substantial production of hydroelectricity, natural gas, coal and oil. Highly developed systems of pipelines and power lines deliver energy to domestic and export consumers. B.C. companies are also pursuing leading-edge alternative technologies, such as fuel cells, and innovative ventures in wind, wave and solar power.

Electric utilities and natural gas suppliers have a proven record of providing reliable energy for both the provincial and export markets. Natural gas suppliers ensure reliability by upgrading production facilities and pipeline capacity to meet growing demand. Electricity suppliers do so by

Electricity trade helps ensure low power rates and reliability for domestic consumers.

BC ENERGY EXPORTS - 2000

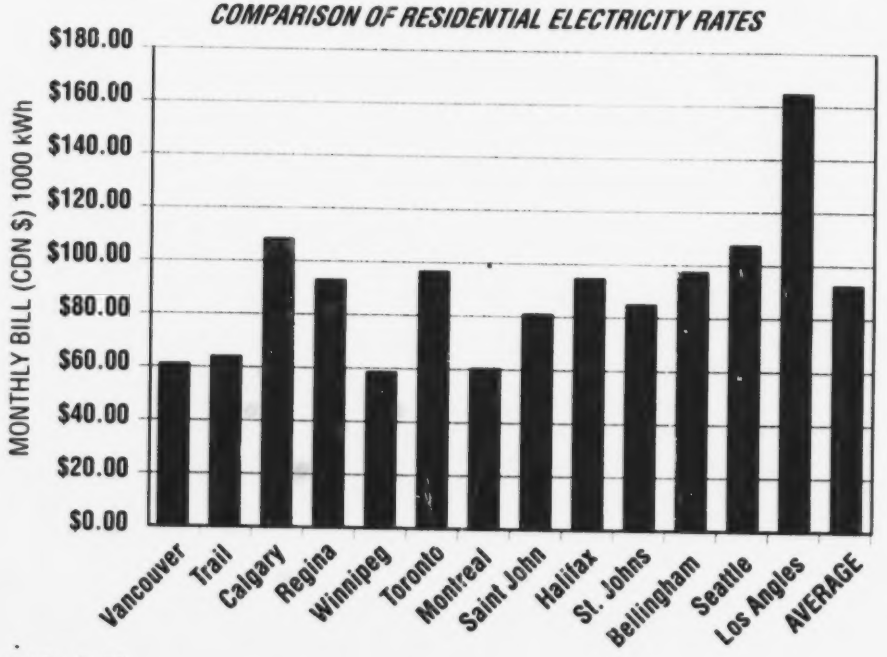


Low electricity rates and public ownership of BC Hydro

maintaining capacity and energy reserve margins (buffers of extra available generation and transmission), developing and applying short-term reliability standards, and participating in a western North American electricity reliability network.

Low electricity rates reflect major public investments in hydroelectric power made a generation ago.

Our electricity rates are among the lowest in North America. A previous generation's investment during the 1960s and 1970s has benefited all British Columbians over the past two decades. Today, hydroelectric facilities on the Peace and Columbia rivers account for approximately 75 percent of BC Hydro's generating capacity. Together with its coastal hydroelectric and thermal power plants, these heritage assets produce electricity at a much lower average cost than the cost of new generation or prices in neighbouring markets.



B.C.'s low electricity rates are the direct legacy of abundant hydroelectric resources and a flexible power system that has enabled trade.

Some jusisdictions have a legacy of public investments in nuclear power, which has proven to be far less reliable as an energy source and far more costly than B.C.'s hydro-based system.

Our advantage in energy technologies offers domestic and export opportunities.

British Columbia profits from a growing alternative fuel industry, as well as expertise in hydroelectric power. The growth of firms such as Ballard Technologies (fuel cells) and Westport Innovations (natural gas vehicles) demonstrates our capacity for technology development. A recent survey of renewable energy strengths identified the Pacific Northwest as having the potential to become a world leader in solar photovoltaics and power transmission technologies.[6] This technological know-how can be used to develop new energy supplies within the province, and to generate additional revenues and jobs from trade.

CHANGING ENERGY MARKETS

Canadian natural gas markets have been deregulated since 1985.

In 1985, the federal government and western provinces agreed to deregulate natural gas to allow consumers to make their own purchase arrangements. Since then, high-volume industrial and commercial consumers have been able to purchase directly from natural gas producers as an alternative to the local distribution utility. All major pipelines provide open access, and an interconnected North American market now functions with little government intervention.

Other jurisdictions have reformed their electricity markets, with mixed success.

Electricity market reform has taken place in a number of other countries, including Great Britain, Norway, Australia, New Zealand, Argentina, Chile, and parts of the United States. In Canada, Alberta and Ontario have significantly restructured their electricity sectors. The rationale for change has generally been to support broader economic reforms (i.e., privatization), reduce electricity prices, and/or comply with access rules in interconnected markets. While there have been many successes in electricity reform, poor timing, inadequate planning, and a lack of regulatory foresight have led to difficulties in some jurisdictions.

The extent of market reform varies in other jurisdictions.

In general, reforms are intended to reduce costs by making electricity markets more competitive. Integrated utility monopolies are typically unbundled into separate generation, transmission and distribution entities. In some cases, generation and distribution are privatized and further divided into multiple companies to create competition. The transmission system is opened up, allowing private generators to sell to the distribution company (wholesale access/competition). A market is usually established to determine competitive pricing for this power. Private generators may also be allowed access to the distribution system, so that they can sell directly to electricity consumers (retail access/competition). Most jurisdictions undertaking such reforms have had power rates significantly higher than those in B.C.

B.C.'s electricity industry has undergone some changes over the past decade.

In the late 1980s, BC Hydro began requesting new generation projects from independent power producers (IPPs). Access to its transmission system, and to Aquila Networks Canada's system, was opened up in 1996. This allowed IPPs to use the transmission network to sell power into the export market, and BC Hydro's export subsidiary (Powerex) to trade directly in US wholesale markets. Starting in 1998, Aquila Networks Canada offered retail access to industrial customers. In June 2001, at the request of the BC Hothouse Growers' Association, the BC Utilities Commission granted approval to IPPs to access BC Hydro's distribution system. Most recently, BC Hydro has been reorganizing into functional business units for generation, transmission, and distribution, in order to make its operations more transparent and cost-effective.

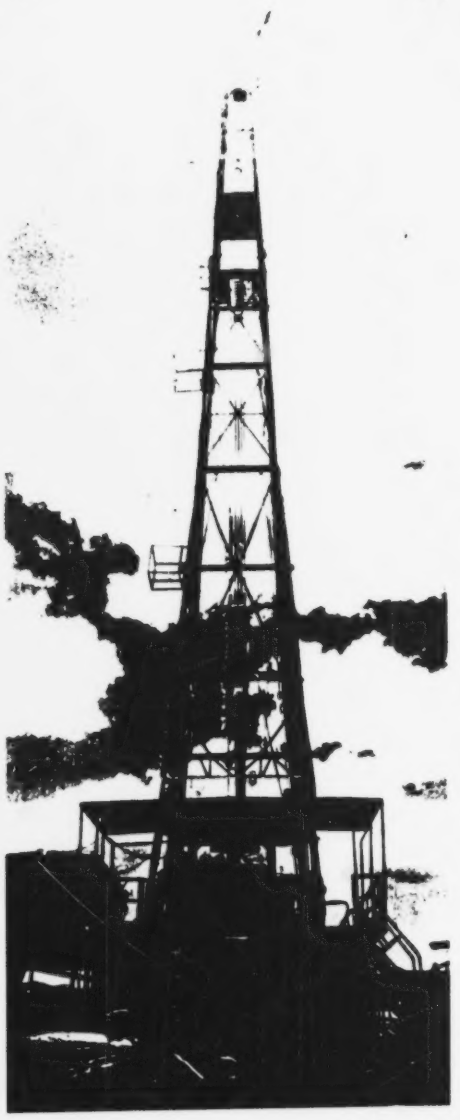
***Energy for Our Future: A Plan for BC* provides a measured response to continue improving our power market.**

B.C. is not ready for, or in need of, large-scale electricity reform. To function properly, competitive markets require many buyers and sellers. Despite the recent growth in private power, the B.C. market is still dominated by a large Crown corporation with a concentration of low-cost generating assets. Moreover, our low power rates do not provide the same impetus for widespread reform as in higher-cost jurisdictions. At the same time, there are opportunities to introduce more competition in the development of new sources of electricity supply, while preserving the benefits of low-cost generation and trade revenues for provincial consumers. This plan includes actions to do just that.

5 United States, National Energy Policy, Report of the National Energy Policy Development Group, May 2001, p. 2-8.

6 Planit Management, Compass Resource Management, and Steeple-jack Consulting, Poised for Profit, Report Prepared for Climate Solutions, November 2001.

Energy for Our Future: A Plan for BC provides a measured response to continue improving our power market.



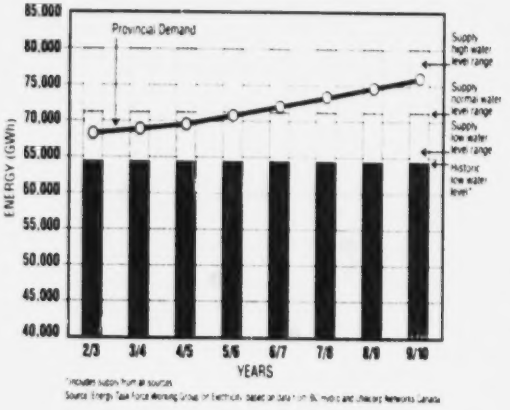
CHALLENGES

ENERGY FACT

A large industrial consumer, such as a pulp mill, might use 400 GWh of electricity anually, equal to the consumption of 40,000 households

Demand for electricity is rising at an average 1.7 percent per year

PROVINCIAL ELECTRICITY SUPPLY / DEMAND OUTLOOK



The B.C. energy sector faces new and ongoing challenges with respect to maintaining energy security, low electricity rates, and a clean environment. These challenges must be addressed if we are to seize on opportunities to develop the sector and strengthen our economy.

THE NEED FOR ENERGY SECURITY

B.C. needs secure, reliable energy to help revitalize the provincial economy.

The development of abundant energy resources was instrumental in establishing our resource-based economy and high standard of living. Key industries, such as forestry, mining, aluminum and chemicals require reliable and affordable energy to keep their economic advantage in world markets. For emerging technology industries, electricity reliability is especially crucial. Secure and reliable energy supplies are needed to drive the new digital economy and support a modern lifestyle that depends increasingly on electric energy for work and leisure.

After a decade of poor economic performance, the government aims to restore B.C. to a leadership position among Canadian economies. Stronger economic growth will mean more demand for energy. Energy development and use that preserve the economic advantage of our industry and provide opportunities for new investment, jobs, revenue and regional growth are integral to the Province's economic policy.

With growing energy demand and aging facilities, investment in new supply is critical.

BC Hydro customer demand is rising at an average 1.7 percent per year.[7] Most of the Crown corporation's generating facilities have been operating for 30 years or more. Significant capital expenditures are required to upgrade existing generation and transmission, so that B.C. consumers will continue to have reliable electricity. Even with this upgrading, the pressing need for power on Vancouver Island (see box) means that additional generation must be installed by 2004.

Similarly, the natural gas supply system is strained, with heavy loading of pipelines at certain times. BC Gas expects demand to grow by one percent annually until 2007.[8] New pipeline capacity must be built to ensure reliable natural gas supplies at reasonable prices for provincial consumers. In addition, northern roads and gas processing facilities must be upgraded to enable exploration, development, and production of natural gas.

Unless new domestic supplies are developed, B.C. will become more dependent on imported energy and vulnerable to price swings.

Imports fulfill a useful role in B.C.'s energy picture. Most of the oil and refined petroleum products (gasoline, diesel fuel, aviation fuel, etc.) we use are imported from Alberta. About 90 percent of these products, consumed in central and southwestern B.C., are transported by pipeline from Alberta.

In the past two years, BC Hydro was a net importer due to low water levels. These imports were necessary to meet domestic electricity requirements. However, over-reliance on imports at wholesale spot market prices could expose B.C. consumers to price volatility in western power markets. The province

The Power Need on Vancouver Island

Vancouver Island's population has grown by 20 percent since 1991, creating more demand for electricity. Electric heating loads are heavier on the Island because natural gas for home heating has only been available for a decade. Total demand on the Island is rising by 30 to 40 MW annually – enough power to light and heat an extra 30,000 to 40,000 homes a year.

With the recent addition of the natural gas-fired Island Cogeneration Plant, local generation currently meets 33 percent of Vancouver Island's power needs. The remainder is supplied from generation on the Mainland via submarine cables, some of which are now more than 45 years old. These cables are due for retirement, and BC Hydro has determined that new electricity supply to replace them will be needed by 2004.

must develop new generation to serve rising demand, or we may experience electricity shortages similar to those in other jurisdictions.

California's recent difficulties with high prices and rolling blackouts show what can happen when poor electricity market design combines with insufficient resources for demand growth. Over the past decade, local opposition to energy development prevented the state from building new power plants. Since the crisis of 2000/01, California has taken steps to restore energy security, including expediting the siting of new in-state power plants.

To avoid costly public investments, governments everywhere are looking to the private sector for new energy development.

In B.C., as in most other provinces, private investment has developed the oil, natural gas and coal industries, while public investment has dominated electricity because of the high cost of large-scale power systems. Given competing priorities for public funds, the government is interested in shifting the responsibility for new power development to the private sector. The advent of new small scale power plants, such as efficient combined cycle gas turbines and small hydro plants, is making it easier to match electricity supply with gradually growing demand. These plants are lower risk and lower cost than the much larger facilities that were the norm of the past. Private power producers, who can compete to bring forward projects to meet B.C.'s growing demand, have the capability and core competency for developing smaller generation resources as an alternative to public investment by BC Hydro.

Access to energy resources is hindered by uncertainty over land use planning and First Nations claims to rights and title, as well as poor quality roads in the North.

The fossil fuel industries require physical access to land to explore for and develop resources. Without access to areas of high resource potential, such as the Muskwa-Kechika Management Area in the Northeast, the oil and gas sector will not be able to sustain its growth. This requires timely land use planning to provide more certainty for exploration and development. Better access is needed not only in traditional areas, but also in regions of the province that are new to particular resource development (e.g., interior and offshore oil and gas basins and coalbed methane across the province).

Poor road networks limit access to resources in northeastern B.C. Most of these public roads were not built to withstand heavy use by the oil and gas industry. Seasonal road bans are getting longer and severely restrict industry activity.

KEEPING ELECTRICITY RATES DOWN

Frozen since 1996, BC Hydro rates require scrutiny in a public process to ensure that they reflect the true costs of electricity.

Under the rate freeze, the BC Utilities Commission has not been able to fulfill its mandate to publicly examine BC Hydro rates. Recently, BC Hydro costs have increased as demand has grown, new supplies have been added and existing facilities have required maintenance. Keeping energy costs down is essential to maintaining B.C.'s economic advantage. Returning BC Hydro to independent oversight by the BC Utilities Commission will ensure that rates remain as low as possible.

Continued trade and access to US markets is necessary for low and stable rates.

The export market provides income to supplement domestic power revenues and maintain low rates. In the United States, proposed new market rules will require an independent entity, separate from generation and distribution, to control the transmission system. This is part of a series of changes being implemented by the US Federal Energy Regulatory Commission, or FERC (see box). B.C. is participating in the development of the western Regional Transmission Organization (RTO West). The Province recognizes the value of integration with US power markets in the revenue, ratepayer and reliability benefits that can be realized.

Environmental responsibility and no nuclear power sources

ENVIRONMENTAL PRIORITIES

Low electricity rates discourage conservation and energy efficiency. Reducing energy use improves the environment, while saving consumers money.

Conservation means cutting energy use, for example by turning down a thermostat or shutting off lights. Energy efficiency means getting more productive use out of energy consumed, for example by purchasing a new furnace that uses less fuel to heat a home. Besides directly lowering consumer energy bills, these activities reduce demand and defer the need for new supply. This avoids costly energy investments and the environmental impacts from development.

Low power rates based on the blended cost of old and new electricity supplies provide a poor price signal for encouraging energy-saving activity. The reason is that, under blended rates, consumers do not see the cost of new electricity supply when deciding how much energy to use. With B.C. electricity rates roughly half the cost of new production, there is currently little incentive for increased conservation and energy efficiency.

Strategies are needed to protect provincial airsheds and watersheds from the effects of energy development and use.

Fossil fuel production and power generation are B.C.'s fastest growing source of the manmade greenhouse gas emissions that have been linked to global climate change. The development and use of energy also have significant implications for sensitive airsheds, such as the Lower Fraser Valley. Province-wide, the largest contributor to local air pollution is energy use in transportation, accounting for almost half of smog-forming pollutants.[9] For community watersheds, a key concern is the impact of hydroelectric power operations on fish habitat, recreation and tourism and other water uses. Effective strategies are required to manage all of these environmental impacts.

Unclear or overly prescriptive environmental standards and inefficient regulatory processes impede sustainable energy development.

To meet the needs of a growing economy, new energy supplies must be developed in a timely, cost-effective, and environmentally responsible manner. Energy developers are

US Market Rules and Regional Transmission Organizations

For the past decade, the US Federal Energy Regulatory Commision (FERC) has been developing rules to make US power markets more competitive and efficient. In 1996, electric utilities regulated by FERC were required to open up access to their transmission systems. Another ruling in 1999 encouraged the transfer of operational control to an independent Regional Transmission Organization, or RTO. Having a large geographic region operated by one independent transmission entity helps ensure a coordinated planning to reduce transmission bottlenecks, facilitate trade and increase reliability. It also encourages private power development through access to competitive wholesale markets.

In August 2002, FERC released a proposal for standard electricity market design, to address transmission under-investment, discriminatory access, and other problems in wholesale power markets. Proposals include the independent operation of transmission, a single open access tariff for all transmission users, and procedures to ensure the long-term adequacy of power supplies. For B.C., this means trade and power development opportunities, reliability benefits of integration and non-discriminatory access to competitive export markets to keep rates low and preserve access to B.C.'s heritage energy.

B.C. has been taking part in the development of an RTO covering the Pacific Northwest. RTO West will operate US transmission systems on behalf of their owners, as well as the region's wholesale power market. In September 2002, FERC accepted most of the current RTO West proposal. Independent governance is expected to be in place by the fall of 2004, with a fully operational RTO by 2006.

ENERGY FACT

B.C.'s greenhouse gas emissions per capita are 29% lower than the national average.

seeking clear, scientifically based environmental standards. The coal industry, as an example, has requested final air emission standards for coal-fired boilers, consistent with those adopted in Alberta, to provide more certainty for po ential electricity development in B.C. Long environmental assessment reviews, backlogs in water licensing, and other regulatory inefficiencies currently add to the costs of energy projects, including those where the impacts and mitigation mea sures are generally well understood (e.g., small hydro plants).

7 BC Hydro. www.bchydro.com/policies/demandgrowth/demandgrowth771.html.

8 BC Gas. BC Gas 2003 Revenue Requirement application, excluding Centra Gas and Burrard Thermal.

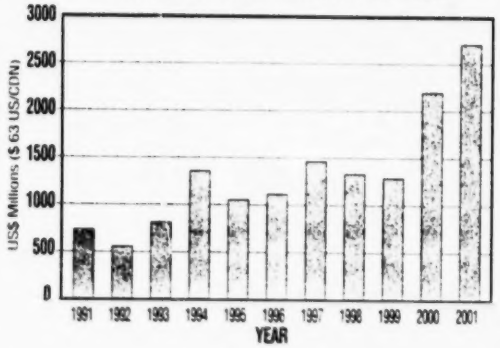
9 2000 Emission Inventory for the Lower Fraser Valley Airshed.

Unclear or overly prescriptive environmental standards and inefficient regulatory processes impede sustainable energy development

OPPORTUNITIES

B.C.'s large, untapped energy sources include oil, natural gas and coal, as well as coalbed methane and other clean sources such as small hydro, wood residue, wind and ethanol.

OIL AND GAS EXPENDITURES FOR 1991 - 2001



The energy sector has the potential to generate new investment, increased trade, and economic growth in an environmentally responsible manner. *Energy for Our Future: A Plan for BC* needs to support efforts to take advantage of these opportunities for the benefit of all British Columbians.

ENERGY FOR A STRONGER ECONOMY

B.C. electricity can be made even more reliable in support of a growing information economy.

Reliable power supply is increasingly important in the move to a digital economy. B.C. electric utilities are developing specialized products and services to offer higher-than-normal reliability for customers such as technology firms. Continued integration of the western electricity market will help to facilitate trade and coordinate transmission planning to remove bottlenecks. It will ensure better access to low-cost generation throughout the western power system.

Our natural resources, talent and technology provide many diverse opportunities for meeting demand growth as efficiently as possible.

B.C. is fortunate to have a growing natural gas industry, significant hydroelectric and alternative energy resources, and large deposits of coal and coalbed methane. We also have considerable potential to save more energy through cost-effective conservation and energy efficiency. Homegrown technologies and expertise can help develop a more diverse and innovative energy system.

With smaller natural gas-fired plants, it is possible to site new generation close to customer demand, reducing transmission costs. Energy efficiency, alternative energy and coalbed methane can generate jobs and investment in regions new to energy development. Overall, there are opportunities to develop new energy resources throughout the province.

Increasing energy trade can improve domestic reliability, enhance continental energy security, and create economic benefits for British Columbians.

In the United States, natural gas use is forecast to grow by more than 50 percent through the year 2020.[10] For electricity generation alone, over 90 percent of planned power plant additions are expected to be fuelled by natural gas. With its conventional natural gas basins in decline, the US is looking to its frontier areas, such as Alaska and the deep Gulf of Mexico, as well as to Canada for new supplies. Modernizing and expanding delivery networks for both natural gas and electricity are part of the US energy policy, which will provide better access to markets for our energy exports.

US electricity demand is projected to rise by more than 45 percent by 2020.[11] Some 22,000 MW of new generation, twice the electrical capacity of BC Hydro, is currently under construction in Western North America.[12] Among other things, these capacity additions have resulted in electricity prices returning to normal levels. Since most of the new facilities will be gas-fired generation, the additional fuel demand could be a boon to our natural gas exports. B.C.'s hydroelectric storage capability, together with north-south differences in production costs and the timing of electricity demands and prices, will ensure ongoing opportunities for trade. Aside from the benefits for provincial consumers, increased access to US wholesale markets can support private power development in B.C.

The private sector has the financial and technical ability to provide new investment in energy supply, with opportunities for jobs and economic growth across B.C.

Since the late 1950s, private companies have invested billions of dollars to develop successful, market-driven fossil fuel industries in the province. The recent high levels of investment in natural gas drilling are expected to continue with expanding demand in domestic and export markets. Exploration and development of oil, natural gas, and coalbed methane outside the Northeast, including interior and offshore basins, can generate investment, jobs, and economic spin-offs throughout B.C.

Historically, as a Crown corporation, BC Hydro was able to access low-cost capital to build its extensive hydroelectric system dominated by mega-projects. Today, with new small generation technologies and more sophisticated capital markets, public investment is no longer required. Independent power producers are willing and able to develop new generation in the province, providing they have reasonable access to the transmission system and there is a level playing field for public and private investment. Compared to large centralized power plants, the development of many scattered IPP projects can mean more jobs and greater opportunities for regional development. Despite the recent difficulties of some energy companies in North America, the private sector has a useful role to play in B.C.'s electricity future.

Land use and pre-tenure planning, closer cooperation with First Nations, and road upgrades can improve access to energy resources.

Pre-tenure plans are required only in the Muskwa-Kechika Management Area, before oil and gas tenures will be issued. A pre-tenure plan identifies sensitive resource values and strategies for environmentally responsible resource development. Both pre-tenure and land use planning processes enable better access to energy resources by clarifying the conditions under which exploration and development can occur. Efforts are also underway to work with First Nations on economic opportunities from resource development. Public-private partnerships will continue to improve road networks in the Northeast.

Performance-based Rate Regulation

Until recently, electricity and natural gas rates were set through cost-of-service regulation and adversarial public hearings. The utility would estimate the costs, including a rate of return, required to serve its growing system. After a public hearing before the BC Utilities Commission, rates would be established for the different classes of customers depending on their share of demand.

Utility rates are typically now determined through negotiated settlements and using performance-based regulation (PBR), which sets targets or caps for pricing. Under this approach, rates are allowed to increase by the inflation rate plus a factor for system growth, minus an efficiency factor. If the utility is able to do better than the specified efficiency factor then it can retain the cost savings for its shareholders and/or ratepayers in the period between rate settings.

ENSURING OUR ECONOMIC ADVANTAGE

B.C.'s existing low-cost generation is a source of long-term benefit for provincial consumers.

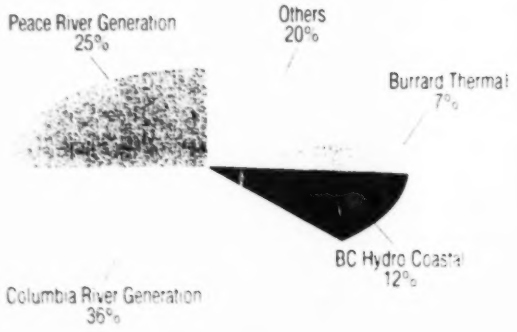
Unlike some other jurisdictions in North America, the province is not encumbered with large unpaid investments in high-cost generation (e.g., nuclear power) that have driven up electricity prices. Instead of stranded investments there are stranded benefits captured in our heritage power assets. These benefits arise from the difference between what it currently costs to produce electricity on the BC Hydro system and what it would cost to replace that electricity in the marketplace (natural gas-fired generation). There are mechanisms available to secure these benefits for BC Hydro ratepayers over an extended period.

Performance-based regulation offers an efficient regulatory tool for getting power rates right.

The provincial Utilities Commission Act (UCA) is designed around inquiries and adversarial public hearings as the basis for regulating energy utilities. In recent years, however, the Utilities Commission has increased its use of negotiated settlements and performance-based regulation. PBR employs multi-year pricing targets and interest-based negotiations among stakeholders, rather than costly adversarial hearings. This form of regulation better aligns shareholder and ratepayer interests by allowing utilities and customers to share the savings from cost efficiency, encouraging further investment and helping to keep energy rates low.

B.C.'s economic advantage includes low cost electricity and public ownership of BC Hydro

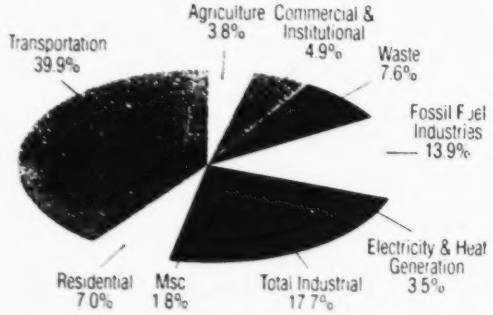
B.C.'s ELECTRICAL GENERATION CAPACITY - 2000



A compact flourescent light bulb uses one-quarter the energy of a standard incandescent bulb.

Environmental responsibility and no nuclear power sources

BRITISH COLUMBIA'S GREENHOUSE GAS EMISSIONS BY SECTOR - 2000



Source: Environment Canada, Canada's Greenhouse Gas Inventory, 1990-2000, June 2002.

EFFICIENT ENVIRONMENTAL MANAGEMENT

B.C. has the capability for more aggressive conservation, energy efficiency, and alternative energy development, as cost-effective ways to protect the environment.

Since the late 1980s, provincial utilities have amassed experience with conservation and efficiency through programs offering rebates and other customer assistance (e.g., Power Smart, Power Sense, Homeworks). Expertise is also vested in private energy service companies and B.C. businesses have initiated their own energy-saving activities. BC Hydro estimates that 10 percent of total electricity demand could be economically reduced by the year 2015. There are opportunities for more aggressive conservation programs by distribution utilities, stronger energy efficiency standards for appliances and equipment and other energy-reducing strategies.

While conservation and energy efficiency avoid impacts on the environment, alternative energy results in smaller environmental impact than conventional energy development (i.e., coal, oil, natural gas, and large-scale hydroelectricity). B.C. has significant resources of small hydro, wood residue, wind, solar and tidal power, some of which could be developed at costs that are competitive with conventional power. BC Hydro has voluntarily agreed to meet 10 percent of new energy requirements between 2001 and 2010 from clean energy purchases. BC Hydro's requests for power to date have met with an overwhelming response from the private sector.

Alternative electricity rate structures offer better price signals to encourage energy-saving investments and behaviour.

Stepped power rates that charge a higher price as energy consumption increases give consumers the incentive to undertake conservation and energy efficiency without increasing the average electricity rate. Time-of-use rates that charge a different price for power depending on the time of day or season encourage consumers who can manage the timing of their electricity use to shift away consumption from higher-priced periods of peak demand. Both of these rate structures have been used successfully in other jurisdictions to save consumers money, reduce utility costs and protect the environment.

Greenhouse gas and airshed management, as well as land and water use planning, can help control the environmental impacts of energy development and use.

Cost-effective actions are available to manage air emissions. For example, through measures such as AirCare, cleaner automobile emissions, and cleaner factories, air pollution in the Lower Mainland has declined by about 40 percent since 1985.[13] The Province has committed to manage the growth in BC's greenhouse gas emissions, and to protect threatened airsheds. These commitments underscore the link between sound energy and environmental policies.

In the Northeast, land use and pre-tenure plans are reconciling industry access to energy resources with concerns for environmental protection. Similarly, BC Hydro is conducting 23 multi-stakeholder water use planning processes to determine hydroelectric operating rules that balance power production, fish habitat, recreation, and other water uses. This process is scientifically based, engages multiple interests in the resource, and will amend existing water licences to reflect contemporary values. A total of nine completed water use plans are anticipated by winter 2003, with the rest expected to be completed by winter 2004.

Clear environmental standards, streamlined approval processes and results-based regulation can ensure lower-cost, environmentally responsible energy development.

Explicit, scientifically determined standards for air emissions, water discharges, and other impacts can be used to screen out environmentally unacceptable projects. Then, efficient regulatory processes can reduce development costs for projects that are considered prudent. Provincial processes, including environmental assessment reviews, air emissions

permitting, and oil and gas development approvals are all moving to results-based regulation. This approach sets clear standards and then allows flexibility for finding the most economical means to achieve them.

Nuclear power is not part of B.C.'s energy future.

Nuclear power is supported by some as a way to satisfy growing energy generation and address climate change, since this form of thermal generation does not produce greenhouse gas emisions. However, the financial and environmental problems experienced in other jurisdictions that have invested in nuclear power make it a risky proposition. The province rejects nuclear power as a strategy to meet the needs of British Columbia.

[10] US National Energy Policy
[11] Ibid
[12] Northwest Power Planning Council and Cambridge Energy Research Associates
[13] Lower Fraser Valley Ambient Air Quality Report

Energy and greenhouse gas emissions

Energy production accounts for about 17 percent of B.C.'s greenhouse gas emissions, lower than the national share (34%) because of our extensive hydroelectric system. While transportation makes up the largest share (40%) of provincial emissions, the electricity and fossil fuel industries are expected to be the fastest growing sources of continuing emissions growth, with their combined emissions forecast to double between 1990 and 2010.

The rapid growth in energy sector emissions reflects the shift to efficient gas turbines for electricity generation and expansion in natural gas production and exports. Although the province's natural gas exports represent clean energy to US buyers, displacing coal and oil, the emissions upstream production and transmission add to provincial emissions.

The energy sector is acting to voluntarily reduce its greenhouse gas emissions production. For example, BC Hydro has committed to offset half the emissions from new gas-fired plants on Vancouver Island through energy efficiency, fuel switching, and other measures. The oil and gas industry has adopted standards to control the emissions from flaring of natural gas that accompanies production. The Ministry of Energy and Mines promotes the reinjection of acid gas into existing natural gas wells to reduce harmful air emissions.

ENERGY FACT

Air pollution in the Lower Fraser Valley are estimated to have declined by approximately 40% between 1985 and 2000.

A legislated heritage contract will help to preserve B.C.'s low electricity rates

In response to these challenges and opportunities, British Columbia needs to make some changes to the energy sector to encourage new investment and increased trade, while ensuring continued low power rates and environmentally responsible energy development. A series of policy actions will be implemented, or are already underway, to achieve these objectives.

LOW ELECTRICITY RATES AND PUBLIC OWNERSHIP OF BC HYDRO

Low rates for B.C. consumers will be entrenched by assuring the benefits from existing generation and trade, preserving publicly owned power assets, outsourcing services where economical, and re-regulating BC Hydro rates so that they recover the costs of production.

THE BENEFITS FROM LOW-COST GENERATION AND TRADE

Policy Action #1 (new): A legislated heritage contract will preserve the benefits of BC Hydro's existing generation.

The heritage contract will essentially lock in the value of existing low-cost generation assets for an extended period. It will be implemented through legislation that specifies the term and amount of energy involved. The contract's term will initially be 10 years, with provisions for renewal thereafter, and the quantity of energy will be the production from BC Hydro's system under average water conditions. The BC Utilities Commission will review and recommend the terms and conditions for the heritage energy based on a return consistent with private utilities. The heritage contract is similar to arrangements that have been adopted in Quebec (see box).

Policy Action #2 (ongoing): BC Hydro ratepayers will continue to benefit from electricity trade.

Electricity trading markets are highly volatile and uncertain. They depend on a convergence of factors, including natural stream flows, fuel prices, seasonal and daily differences in demand, transmission congestion, competitive supply costs, and market developments in the United States. An appropriate level of trading benefits will continue to be assigned for rate-setting purposes to help maintain low and stable rates for B.C. consumers. A separate entity, the BC Hydro Transmission Corporation, will operate BC Hydro's publicly owned transmission system. This will ensure fair access for all generators and the provision of independent transmission service to maintain and increase B.C.'s trading activity with US wholesale power markets.

PUBLIC OWNERSHIP AND EFFICIENCY

Policy Action #3 (ongoing): Public ownership of BC Hydro's generation, transmission and distribution assets will continue.

A generation of British Columbians before us invested heavily in the hydroelectric network on the Peace and Columbia

Quebec and Low-Cost Hydroelectric Power

In the 1960s, Quebec established a Social Compact requiring province-wide electrification, uniform cost-based power rates, and the use of its hydroelectric resource endowment for the benefit of provincial citizens. This mandate was reinforced in a new energy policy in 1996, and the Quebec government clarified the roles of existing low-cost generation and future competitive electricity supply in legislation passed four years later.

Bill 116 created a "heritage pool" that assures provincial customers up to 165 TWh of annual Hydro-Quebec generation at the fixed rate of 2.79 cents per kWh. This rate, which can be reduced but not increased, is currently the lowest in North America for such a large quantity of power. Beyond the pool limit, the utility's generation arm (Hydro-Quebec Production) can sell at market prices, while its distribution arm (Hydro-Quebec Distribution) must acquire new supply from an open bidding process that includes private power producers and other alternative suppliers.

rivers. Three decades later, that investment is yielding substantial returns. B.C. consumers have electricity that is low-cost, reliable, clean, and renewable. Provincial taxpayers, as ultimate owners of the assets, receive a fair return on the invested capital, with BC Hydro's annual dividend averaging about $350 million over the past five years.

Public ownership is consistent with more competition in electricity markets. Even where markets have been significantly reformed, publicly owned generation coexists with private power. For example, since its electricity reforms in the early 1990s, Norway has increased the share of private generation, but its hydro-based system remains largely in public hands. Organizations such as Hydro-Quebec and the US Bonneville Power Administration continue to recognize the unique value of hydroelectric power in advancing social and environmental goals.

Policy Action #4 (new): BC Hydro will outsource the delivery of services where costs can be reduced for electricity consumers while maintaining quality of service.

Recently, BC Hydro has been working to outsource services such as customer billing, information technology, human resources, and financial and procurement services. This is part of a series of internal changes designed to make its operations more flexible and cost-effective. As part of the re-regulation of BC Hydro rates (see below), the BC Utilities Commission will be reviewing the Corporation's costs to determine that they are in ratepayers' interests. To help keep rates low, BC Hydro will explore further opportunities to outsource services where cost savings can be achieved and the quality of customer service will be maintained or improved.

RE-REGULATION OF BC HYDRO RATES

Policy Action #5 (new): The BC Utilities Commission will once again regulate BC Hydro rates.

The current rate freeze will end on March 31, 2003 and will not be extended. Rates will again be regulated to cover the projected costs of electricity to consumers. With re-regulation, there will be immediate pressures for rates to rise to cover maintenance expenditures and investment in new generation and transmission. However, any rate changes will be mitigated in several ways. First, the value of low-cost generation will be locked in for ratepayers under the heritage contract and BC Hydro ratepayers will continue to benefit from trade. Second, investment in new power supplies will come from cost-competitive private power development. Third, once new rates have been determined, subsequent rate changes will be set through performance-based regulation, which encourages the sharing of cost savings with ratepayers. In any case, properly regulated rates that reflect actual electricity costs will provide a better signal for new investment, conservation, and energy efficiency over time.

A number of actions in this plan, such as the heritage contract, will require further development before a BC Hydro rate hearing can proceed. The BC Utilities Commission will conduct an inquiry to develop and refine these policy areas prior to the rate hearing. The terms of reference for this policy inquiry will be released in January 2003, and will include a timetable for completion. Following the policy phase, BC Hydro will make a revenue requirements filing with the Commission before the end of 2003/04.

The Province is taking the political interference out of rate-setting

Policy Actions under other strategic objectives that also support low power rates:

#6	The Vancouver Island Generation Project will be reviewed by the BC Utilities Commision to determine if it is the most cost-effective means to reliably meet Island power needs
#9	Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission
#13	The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants
#15	The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets
#21	New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency
#22	The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings
#23	The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency

Vancouver Island businesses and residents use one-fifth of BC Hydro's electricity

SECURE, RELIABLE SUPPLY

Secure, reliable energy for B.C. consumers will be ensured through new power for Vancouver Island, ongoing reliability efforts, the least-cost acquisition of new power, exploration and development of new oil and gas resources, and more efficient regulation by the BC Utilities Commission.

RELIABLE ELECTRICITY AND NATURAL GAS

Policy Action #6 (new): The Vancouver Island Generation Project will be reviewed by the BC Utilities Commission to determine if it is the most cost-effective means to reliably meet Island power needs.

BC Hydro examined two primary options for increasing power capacity to Vancouver Island: additional gas-fired generation on the Island and a new natural gas pipeline, or new submarine transmission from the Mainland. BC Hydro found the second option to be more expensive, requiring transmission upgrades and new generating capacity elsewhere in the province. In June 2002, BC Hydro applied for environmental approval of a 265 MW natural gas-fired plant to be sited at Duke Point in Nanaimo. This project may be developed by either BC Hydro or an IPP. Should BC Hydro undertake this project, a Certificate of Public Convenience and Necessity (CPCN) from the BC Utilities Commission must be obtained.

Policy Action #7 (ongoing): High reliability and energy security will be maintained through well-functioning natural gas markets and coordinated electricity planning.

There are two active natural gas trading hubs, one at Station 2, a delivery point south of Fort St. John on Duke Energy Gas Transmission's system, and the second on the BC/Washington State border, at Sumas. The Sumas trading hub tends to have more volatile prices. A price spike in December 2000 was particularly difficult for large consumers who had opted for spot price contracts. Nonetheless, the government is confident that natural gas markets are functioning properly, and that they will provide the necessary response to any deficiency in supply. Indeed, several proposals are currently under review to increase pipeline capacity, for example, the Duke Energy Mainline expansion, Inland Pacific Connector, and Georgia Strait Crossing projects. Market participants, including neighbouring suppliers in Washington State, are also pursuing north-south strategies to improve the reliability of natural gas supply and reduce price volatility.

In electricity, the Western Electricity Coordinating Council is responsible for comprehensive reliability management in the western grid. Regional transmission organizations, such as RTO West, will facilitate and coordinate planning to remove transmission bottlenecks and increase trade. BC's participation in RTO West, together with our high reliability standards and publicly owned transmission assets, will ensure that provincial consumers have continuing access to reliable electricity.

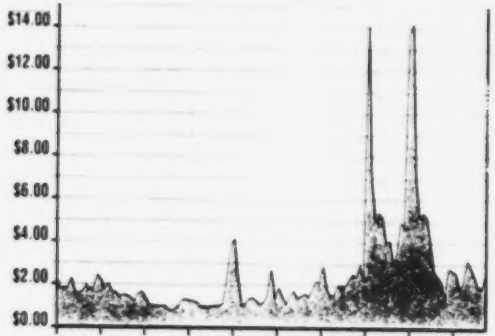
Policy Action #8 (new): BC Hydro distribution will operate as a separate line of business from generation.

The obligation to serve electricity customers will be vested in BC Hydro's distribution line of business. Distribution will acquire energy under the heritage contract from BC Hydro's generation line of business at the price determined by the BC Utilities Commission.

Policy Action #9 (new): Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.

When deciding how to meet a projected power need, BC Hydro's distribution business will compare the costs of all potential resources, including IPP purchases, customer-owned generation, BC Hydro plant efficiency improvements (Resource Smart), conservation and energy efficiency, and firm imports. The distribution arms of other B.C. electric utilities are encouraged to adopt a similar resource acquisition process, if they have not already done so. The BC Utilities Commission will oversee the acquisition process to ensure that least-cost options are chosen consistent with a new clean energy goal (see Environmental Responsibility and No Nuclear Power Sources).

NATURAL GAS PRICES
(US$/MMBtu)



Source: Inside Federal Energy Regulatory Commission Index

NEW OIL AND GAS RESOURCES

Policy Action #10 (ongoing): Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic growth.

The development of BC's large untapped coalbed methane (CBM) resources can benefit both BC consumers and investors (see box). The Ministry of Energy and Mines is implementing a strategy to develop CBM as a clean, environmentally safe energy source that can serve local, domestic and export markets. After a year-long collaboration between government and industry, a new royalty regime was introduced in March 2002 to address CBM's unique development and production challenges. The Oil and Gas Commission is preparing guidelines that will clarify the regulatory requirements for projects. The Ministry has also been working with industry, First Nations, and other stakeholders to provide information on the potential resources, environmental impacts, and economic benefits associated with this new resource opportunity. In addition to CBM, B.C. has other unconventional resources including shale and tight gas as well as the recently reported deposits of methane hydrates off the west coast of Vancouver Island.

Policy Action #11 (new): The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to a develop a provincial position, work with the federal government and move effectively toward development of offshore resources.

Moratoria from both the federal and provincial governments currently prohibit exploration and development of offshore hydrocarbons. The Minister of Energy and Mines appointed a scientific panel headed by Dr. David Strong, which found no scientific basis for a blanket moratorium on the entire BC coast. The panel made a number of recommendations that are now being pursued in partnership with the University of Northern British Columbia.

Before offshore development can proceed, further issues need to be resolved. The provincial and federal governments will have to agree on an overall management regime, including regulatory, royalty, and environmental requirements. The Province will also need to work with coastal communities and First Nations to ensure that benefits accrue to the areas where activity occurs.

STRENGTHENING THE BC UTILITIES COMMISSION

Policy Action #12 (new): The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other distributors, will be strengthened.

With the return to BC Hydro rate regulation, a strong and competent regulator is needed. The BC Utilities Commission has been a Canadian leader in the approval of wholesale and retail access for electricity and gas, the efficient determination

Coalbed Methane: A New Opportunity

CBM is the natural gas found in most coal deposits. It is created through a process by which plant material is converted into coal over millions of years. Under most circumstances, CBM consists of pure methane gas. Commercially produced CBM can be distributed by the existing natural gas pipeline system and used as a heating fuel and alternative transportation fuel.

In the 1980s, tax incentives led to the rapid growth of CBM production in the United States. Today, it accounts for more than 7 percent of total annual US natural gas produced. An unprecedented number of CBM projects in BC and Alberta are evaluating gas production characteristics. Nine experimental projects are underway here – 7 in the Northeast and one in the Southeast – and one well has been drilled on Vancouver Island. Commercial production could begin within a few years.

Because coalbed methane is a pure or "sweet" gas, it usually requires little processing before entering the pipeline. Compared to conventional natural gas, CBM development commonly results in large amounts of water being produced prior to and during gas extraction. The production and disposal of water is regulated to minimize impacts on the environment and nearby communities.

In 2001, oil and gas exploration companies drilled three times the number of wells they drilled in 1990

Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic growth.

of utility rates of return, and the adoption of performance-based regulation and alternative dispute resolution. To fulfill its mandate, the Commission will be strengthened by appointing two full-time Commissioners. The Utilities Commission Act will be amended to focus more on performance-based and results-based regulation, including negotiated settlements, and to define effective consumer participation.

MORE PRIVATE SECTOR OPPORTUNITIES

To increase the role of the private sector in energy supply, private power production will be encouraged, access to the transmission system will be improved, oil and gas investment will be supported, and some customers will be able to choose their suppliers.

INVESTMENT IN PRIVATE POWER

Policy Action #13 (new): The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.

The private sector is well positioned for power development, given its ability to find entrepreneurial capital, efficiently build and operate facilities, and take on the associated risk. B.C.'s independent power producers (IPPs) have already demonstrated that they can come forward with cost-effective projects. With BC Hydro's participation limited to efficiency improvements and capacity upgrades at existing facilities, IPPs will be able to serve new domestic needs and explore opportunities in the export market. The intent will be to encourage the private sector to find a variety of innovative and economical ways to satisfy the growing demand for power.

BC Hydro's relative strengths lie in the operation of large-scale hydroelectric generation. While BC Hydro does not plan to invest in the construction of new hydroelectric facilities at the present time, any proposed new BC Hydro hydroelectric facility, such as Peace Site C, must be brought to Cabinet for approval before being considered by the Utilities Commission as a source of supply. Cabinet will then decide whether the project should be developed by BC Hydro or the private sector.

Policy Action #14 (new): Under new rate structures, large electricity consumers will be able to choose a supplier other than the local distributor.

New stepped pricing (see Conservation and Efficiency) will provide an incentive for large industrial or transmission rate customers to purchase from IPPs, or to self-generate, when they can do so less expensively than the utility's cost of new supply. These larger customers will be able to meet all or a portion of their consumption from private generation. This policy change introduces retail competition for large BC Hydro customers. Aquila Networks Canada already offers retail access to its industrial customers.

Policy Action #15 (new): The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.

A new publicly owned entity, BC Hydro Transmission Corporation, will be responsible for planning, operating, and managing BC Hydro's transmission system. The transmission assets will continue to be owned by BC Hydro. The corporation will have a separate board of directors and will be regulated by

Policy Actions under other strategic objectives that also support secure, reliable supply:

#1	A legislated heritage contract will preserve the benefits of BC Hydro's existing generation.
#13	The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.
#15	The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.
#18	Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.
#19	Natural gas marketers will be allowed to sell directly to small volume customers, and will be licensed to provide consumer protection.
#21	New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.
#22	The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings.
#23	The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

the BC Utilities Commission. It will ensure that there is adequate transmission capacity available to reliably serve domestic and export needs, and that all electricity suppliers and buyers have non-discriminatory access to this capacity. The corporation will assess the need for new transmission and will be authorized to direct expansions of the transmission system where required.

Establishing the BC Hydro Transmission Corporation, implemented through legislation as a separate entity, will improve the ability of independent power producers and BC Hydro to participate in regional wholesale markets. Access to these markets is important if we are to attract the new investment required for power development and generate export revenues which help to keep provincial electricity rates low.

Policy Action #16 (new): The BC Utilities Commission will determine the terms and rates for this new transmission entity.

The BC Utilities Commission will review and approve wholesale transmission rates. In an initial rate hearing, the commission will consider issues such as the allocation of costs between generation and transmission, and exit and entry fees for large customers who leave the BC Hydro system (under the new rate structure). Once the initial rates have been determined, future rate changes will also be reviewed and approved by the commission.

SUPPORT FOR OIL AND GAS DEVELOPMENT

Policy Action #17 (ongoing): The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years.

The ministry provides ongoing industry support in the form of information on natural gas resources and the promotion of B.C. investment opportunities outside the province. It regularly reviews resource royalty and tax regimes to maintain our competitive position for attracting energy investment. New royalty regimes were introduced for natural gas in 1998 and coalbed methane in March 2002. Reduced royalties may be considered for other emerging resource opportunities (e.g., shallow and deep gas) and unconventional resources (e.g., shale and tight gas).

The Oil and Gas Commission is further streamlining its one-window approval process for oil and gas development. Under a new general development permit, companies can now apply for a review of their overall plans for the development of an area, rather than having to make separate applications for a number of activities (e.g., roads, wells, pipelines) at different times. Other improvements include a streamlined permitting process for petroleum roads and reduced review times for geophysical, well, and pipeline applications where supported by a professional forester.

Policy Action #18 (ongoing): Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.

Two pre-tenure plans have been completed for the Muskwa-Kechika Management Area, with oil and gas tenures issued and a successful natural gas well drilled in one of the planning areas. The Ministry of Sustainable Resource Management is expediting the process to deliver the six remaining pre-tenure plans by December 2003. The Ministry of Energy and Mines will increase its involvement in land use planning to ensure that the value of undiscovered oil and natural gas resources is properly recognized, and that access to these resources is not unduly compromised. This will be accomplished by providing better information on oil and gas potential and having a ministry representative on land use planning committees.

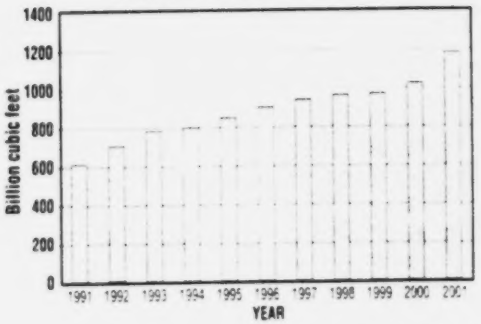
In November 1999, $103 million was committed over six years to upgrade existing public roads used by the oil and gas industry in northeastern B.C. Investment to date has already resulted in increased land sales and royalties, summer drilling programs, and private road building off the improved public roads. With legislation passed in spring 2002 the Ministry of Energy and Mines can pursue innovative public-private partnerships (see box) that support the development of a strong and efficient road network for increased oil and natural gas activity.

Public Private Partnerships: The Sierra-Yoyo-Desan Road Project

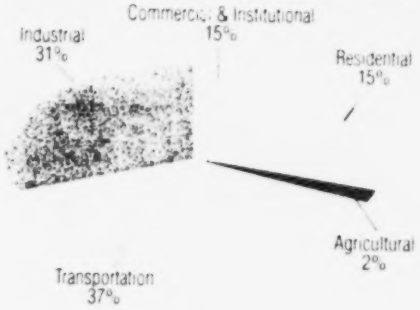
In December 1998, government and industry formed a five-year partnership to upgrade and maintain the Sierra-Yoyo-Desan road northeast of Fort Nelson. This road is part of a network providing access to more than 27,000 square kilometres of oil and gas rich territory that produced about $232 million in royalties and taxes, and $126 million in land sales in 2001. Under the $12.6 million partnership, the costs of improvements are recovered in fees paid by petroleum, seismic, construction and timber companies, while the government contributes to road maintenance costs. The general public has free access to the road.

As a result of the road improvements, drilling activity increased 252% overall, and 400% in the months outside of the traditional winter drilling season (December to April). Funding is needed beyond the partnership term (ending November 2003) to maintain the road and further upgrade it to allow for additional increases in activity levels.

NATURAL GAS SUPPLY 1991 - 2001



ENERGY CONSUMPTION BY SECTOR - 2000



NATURAL GAS SUPPLIER CHOICE FOR SMALL VOLUME CONSUMERS

Policy Action #19 (new): Natural gas marketers will be allowed to sell directly to small volume customers, and will be licensed to provide consumer protection.

For three years, natural gas suppliers, ratepayer groups and the BC Utilities Commission have been working to extend direct sales to residential and small commercial customers. New tracking software will allow customer bills to identify from whom natural gas was purchased and what it cost. Although gas brokers and marketers have successfully shown that they can provide a customized array of low-cost services, some jurisdictions (e.g., Ontario and Alberta) have required licensing and bonding to protect consumers from misleading marketing practices.

The Utilities Commission Act will be amended in spring 2003 to allow direct natural gas sales to low-volume customers, and to require the licensing of marketers who serve those customers. The commission will establish the rules, including posting of a security deposit, to obtain a gas marketing licence.

In addition, the requirement for large natural gas customers to file their supply contracts with the commission will be removed, since the high-volume direct sales market is now mature and a high level of regulatory oversight is no longer needed.

ENVIRONMENTAL RESPONSIBILITY AND NO NUCLEAR POWER SOURCES

Environmentally responsible development and use of energy will be ensured through the promotion of cleaner energy sources, measures to increase conservation and energy efficiency, strategies for controlling air emissions and clearer, more efficient environmental regulation.

ALTERNATIVE ENERGY DEVELOPMENT

Policy Action #20 (new): Electricity distributors will pursue a voluntary goal to acquire 50 percent of new supply from *BC Clean Electricity* over the next 10 years.

BC Clean electricity refers to alternative energy technologies that result in a net environmental improvement relative to existing energy production. Examples may include small/micro hydro, wind, solar, photovoltaic, geothermal, tidal, wave and biomass energy, as well as cogeneration of heat and power, energy from landfill gas and municipal solid waste, fuel cells, and efficiency improvements at existing facilities. This broad definition will allow for the development of a diverse range of cost-effective and environmentally responsible resources across the province.

BC Hydro has already surpassed its voluntary target to meet 10 percent of new energy requirements from clean energy. A goal of 50 percent of new supply between 2002 and 2012 is achievable, given the broader definition of BC Clean electricity. The 50 percent level is expected to push the market for new energy sources. It may raise electricity rates by 0.1 to 0.2 percent per year over the next decade.

The goal will be voluntary so that distributors have the flexibility to acquire electricity at competitive prices. At the

Policy Actions under other strategic objectives that also support more private sector opportunities:

#9	Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.
#10	Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic growth.
#11	The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to a develop a provincial position, work with the federal government and move effectively toward development of offshore resources.
#12	The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other energy distributors, will be strengthened.
#25	Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.
#26	To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.

same time, the BC Utilities Commission will take the goal into account when overseeing the acquisition process for new resources (see Secure, Reliable Supply). The goal will apply equally to the distribution businesses of BC Hydro, Aquila Networks Canada and other investor-owned utilities. They will develop policies (e.g., net metering and interconnection standards) to achieve the goal.

CONSERVATION AND ENERGY EFFICIENCY

Policy Action #21 (new): New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.

The BC Utilities Commission will conduct a hearing to develop new stepped and time-of-use pricing for BC Hydro's industrial and large commercial customers. As a principle, for stepped rates, the last block of energy consumed should reflect the cost of new supply. This will encourage these customers to meet part of their electricity needs through conservation and energy efficiency, or from other sources (self-generation or IPP purchases), where they can do so cost-effectively. To keep rates low overall, the stepped rate structure will be revenue-neutral (see box). Time-of-use rates will encourage customers who can manage the timing of their electricity use to shift consumption to low-priced off-peak periods. Both rate structures will benefit British Columbians by deferring the environmental impacts of new power development.

The BC Utilities Commission has approved time-of-use pricing and stepped fixed charges for Aquila Networks Canada customers, and time-of-use pilots for large BC Hydro customers. Given the administrative costs of rate design and the metering investment required for time-of-use rates, these alternative rate structures tend to be less feasible for small customers. Stepped rates will be initially applied to large rate customers. They may be applied, at a later date, to other customer classes.

Policy Action #22 (new): The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments and others to improve energy efficiency in new and existing buildings.

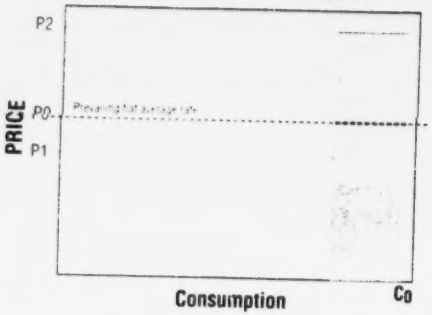
In 1991, B.C. passed an Energy Efficiency Act to set energy performance standards for new appliances and equipment. Minimum performance standards now cover a variety of appliances and equipment, including refrigerators, water heaters, heat pumps, woodstoves, electric motors, and street lighting. There are opportunities to expand the existing regulations to include products such as residential and commercial lighting, *natural gas fireplaces, and water-using* equipment. Minimum performance levels already established for equipment (e.g., natural gas furnaces) can be upgraded and further harmonized with national and international standards. The Ministry of Energy and Mines will pursue these opportunities with the federal government, electricity and natural gas distributors, standards associations and the equipment industry.

A number of activities are underway to improve building energy efficiency in the province. For example, the BC Buildings Corporation delivers a high performance buildings initiative that provides tools and information for energy efficiency improvements in public buildings (e.g., schools and hospitals). The Greater Vancouver Regional District (GVRD) is developing a Better Buildings Partnership that includes a revolving fund for commercial and institutional energy retrofits. The government will work with Natural Resources Canada, GVRD, energy distributors, builders, developers, and others to strengthen and supplement these efforts.

Policy Action #23 (new): The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

There is a bias in the application of the Utilities Commission Act against conservation and energy efficiency investments, relative to investments in new energy supply. Electricity and natural gas distributors do not earn a return on energy-saving expenditures as they do on new generation and transmission spending. The Province will amend the Act to remove this

STEPPED RATES FOR CONSERVATION AND ENERGY EFFICIENCY



Stepped Rates for Conservation and Energy Efficiency

A revenue-neutral two-step electricity rate charges less for the first block of electricity consumed (P_1), and more for the second block (P_2), relative to the prevailing flat average rate (P_0). At the higher price P_2, the consumer has a greater incentive to cut back on electricity use, or to invest in cost-effective energy efficiency for that portion of consumption. At the existing consumption level C_0, the total cost to the consumer and the total revenue to the distribution company offering the rate are unchanged.

In February 2002, the BC Progress Board ranked B.C. first in Canada in terms of environmental quality.

disincentive, with the goal of encouraging further utility investment in conservation and energy efficiency.

CONTROLLING AIR EMISSIONS

Policy Action #24 (new/ongoing): The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.

Policy Actions under other strategic objectives that also support environmental responsibility:

#13	The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.

The Ministry of Water, Land and Air Protection and the Ministry of Energy and Mines (MEM) are leading the development of a comprehensive climate change plan. MEM already promotes the reinjection of acid gas into existing natural gas wells, to reduce harmful air emissions. Work is underway with other western provinces and the federal government to test new reinjection and cleaner coal technologies, and to define requirements for the capture and storage of carbon dioxide in depleted oil and gas reservoirs and coal seams. Future plans include sponsoring related research at B.C. universities, designing pilot activities for mineral sequestration of CO_2, and examining opportunities for linking coalbed methane development and CO_2 disposal.

It is recognized that the siting of new energy supply operations is a particularly pressing issue for vulnerable airsheds. Certain kinds of supply can result in a net reduction in local air emissions. As part of the commitment to protect threatened airsheds, airshed management plans will be developed in partnership with industry, the federal and local governments, and others to define the steps required to improve air quality.

IMPROVING REGULATION

Policy Action #25 (new/ongoing): Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.

The provincial environmental assessment process has recently been reformed to make it more flexible, streamlined, cost-effective, and tailored to the needs of individual projects. This will include reducing duplication and overlap with federal environmental reviews. Under the reformed provincial process, some projects may by subject to a simpler process, or may be reviewed through other mechanisms. Decisions on how to handle project reviews will be made on a case-by-case basis depending on the project's profile and unique circumstances. In addition, concurrent permitting will allow for the more timely development of energy projects.

The Oil and Gas Commission issues water licences and land tenure applications for the oil and gas sector, including federally regulated facilities. In February 2002, the ajudication of applications for crown land and water for other sectors was merged into an integrated review process administered by Land and Water British Columbia Inc (LWBC). LWBC has prepared guidelines for applicants to clarify the process, and is working to eliminate the backlog in small hydro applications.

The Ministry of Water, Land and Air Protection has begun consultations to revise the Waste Management Act and Regulations governing air emissions and water discharges from facilities. It is anticipated that this 18-month review will result in significant amendments to the legislation and regulations, as well as new and innovative environmental management tools.

Policy Action #26 (new): To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.

Coal-fired electricity generation is currently an important source of electricity in other provinces, but not in B.C., despite large resources of cleaner thermal coal. For some industrial consumers, coal became an economically attractive energy source when natural gas prices rose sharply in 2000 and 2001. Further volatility in natural gas prices could lead to increased pressure to use coal as a replacement fuel. The province needs well-defined environmental standards and an efficient regulatory process for evaluating potential coal-fired electricity developments.

Since 1995, B.C. has had interim guidelines in place for emissions of nitrous oxides, sulphur dioxide, metals, and particulates from coal-fired power boilers. These guidelines, which are based on best available control technology, are meant to assist project proponents and help Ministry staff with the environmental assessment and waste permit application processes.

Alberta has established technology-based emission requirements for coal-fired plants. Permit limits are no less stringent than the technology-based limits in the guidelines. However, permit limits may be more stringent if a site specific dispersion model prediction determines that this is required at the particular location to ensure that ambient air quality objectives in the receiving airshed will be met.

On January 1, 2003, the Ministry of Water, Land and Air Protection will adopt emission guidelines for coal-fired power plants that will allow B.C. to compete for investment with neighbouring jurisdictions. Specific dispersion model predictions will determine whether more stringent stack limits are required at any proposed location. To determine if more stringent stack limits are required, proponents will undertake specific dispersion model predictions.

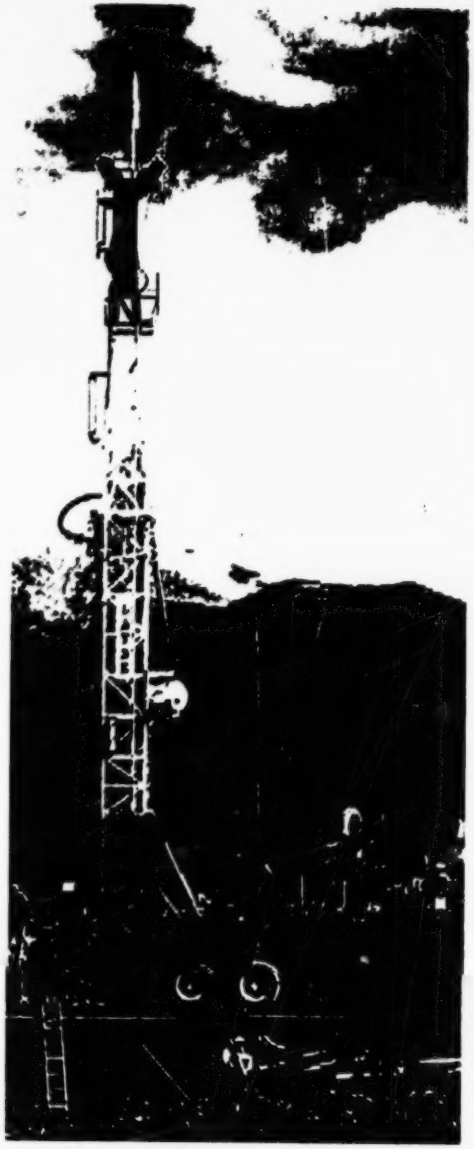
Designing an Effective Portfolio Standard

B.C.'s clean energy goal is a variation on renewable portfolio standards (RPS) that have been adopted in jurisdictions such as Australia, Denmark, the Netherlands, Italy, the United Kingdom, Massachusetts, Nevada, and Texas. These standards require a minimum amount of electricity (usually a percentage of total sales) to be purchased from particular energy types or technologies. Key issues for the design of an RPS are the coverage of clean energy resources and the level of the standard.

Most portfolio standards limit their coverage to small-scale renewable energy sources, although in some cases large hydropower, cogeneration, and energy efficiency measures (e.g., heat pumps) are also included. Maine, for example, allows existing domestic hydroelectricity to be counted towards its current 30% standard. By excluding large hydro but allowing other energy sources such as municipal solid waste and cogeneration, the B.C. goal offers greater regional flexibility in developing environmentally responsible generation.

How big a portfolio standard should be depends essentially on how much more customers are willing to pay for clean energy. Compared to other jurisdictions, the province's lower electricity rates make alternative energy generation less attractive. The fact that many alternative electricity resources are located further away from customer loads, and provide intermittent or seasonal energy, adds to the costs of delivery and reliability relative to conventional generation (e.g., a gas turbine). The level of the clean energy goal must be set so as not to unduly raise electricity rates over time.

CONCLUSIONS



This plan has described a series of actions to ensure low electricity rates and public ownership of BC Hydro; secure and reliable energy supply; increased opportunities for the private sector in energy production; and environmentally responsible energy development and no nuclear power sources. These actions will be implemented over the next two years.

The B.C. energy sector is vital to the prosperity of British Columbians.

Demands for energy in B.C. and export markets have supported the development of a diverse, reliable, and economical energy supply system. Our extensive hydroelectric power and natural gas systems benefit British Columbians and export customers alike. New energy supplies are essential if we are to meet the needs of a growing population and economy over the coming years. B.C.'s energy resources together with our homegrown technology and talent, can continue to ensure energy development and use that are both economical and environmentally responsible. They will help sustain our traditional resource industries and attract and grow an expanding technology sector. Energy has an important role to play not only in revitalizing and developing the provincial economy, but also in supporting the lifestyle and clean environment that makes B.C. a coveted place to live.

This energy plan provides recommendations to build on B.C.'s strengths with opportunities for the continued enrichment of all British Columbians.

The B.C. energy sector is already highly developed. We have abundant energy resources, including natural gas, oil, coal, coalbed methane, hydroelectricity, and alternative energy. We can also do more to reduce energy use through conservation and energy efficiency. New B.C. technologies and expertise, in areas ranging from hydroelectricity to fuel cells, can be harnessed for energy development and export. The actions in this plan statement will build on our existing strength to provide opportunities for increased investment, trade and economic development across the province.

Each of the key players in the energy sector will benefit from the policy.

The 26 policy actions and their benefits for energy consumers, the private sector and the province are summarized in Table 1. In this table, economic opportunities encompass a lower production cost for B.C. industry, jobs and regional economic development. These actions will affect key participants in the energy sector as follows:

Energy consumers. Electricity consumers will be assured low electricity rates through the heritage contract for existing low-cost generation, continued access to trading benefits, efficient private electricity development, and effective regulation to keep rate increases down. New rate structures will allow large power users to save on their energy bills and meet a portion of consumption requirements through energy saving activity, private power purchases or self-generation. Small natural gas consumers will be free to buy directly from natural gas suppliers other than the local distribution company.

Energy distributors. To ensure low electricity rates, BC Hydro and Aquila Networks Canada will acquire new resources on a least-cost basis, with regulatory oversight by the BC Utilities Commission. They will offer new rate structures to large customers, and will pursue a clean energy goal of 50 percent of new power supply over 10 years. Natural gas companies will face competition to supply small as well as large customers. All energy distributors will have their rate changes determined by the BC Utilities Commission using performance-based regulation. A regulatory change will remove the disincentive to conservation and energy efficiency investment.

BC Hydro. BC Hydro will retain ownership of its power assets. To make operations more efficient and transparent, it will continue to reorganize into separate business units for generation, transmission and distribution, and will outsource services where cost savings can be achieved. The mandate of the generation business will be to manage the heritage assets, make efficiency improvements at existing facilities and provide energy and capacity to the domestic market while maximizing trade revenue potential and investment return to the Province. A new separate entity, the BC Hydro Transmission Corporation, will plan, operate and manage the BC Hydro system, with the

transmission assets remaining publicly owned. This change will enable power marketers to continue to benefit from selling into US wholesale markets. The distribution business will have an obligation to serve customers, and will procure power at least cost while maintaining the BC Clean goal. The current rate freeze will be lifted and BC Hydro rates will again be regulated by the BC Utilities Commission.

Independent power producers. IPPs will be responsible for developing new generation in the province. The new BC Hydro Transmission Corporation will provide nondiscriminatory access to the BC Hydro transmission system at rates to be determined by the Utilities Commission. IPPs will be able to sell directly into regional wholesale markets. They will also be able to compete with distributors to serve all or a portion of large consumers' requirements.

Oil, natural gas and coal producers. Land use and pre-tenure plans and northern road upgrades will improve access to resources for oil and gas producers. Royalty restructuring will support new and emerging resource opportunities, such as coalbed methane and unconventional natural gas. The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to a develop a provincial position, work with the federal government and move effectively toward development of the offshore resources. Clear emission standards for coal-fired power plants will provide greater regulatory certainty for electricity development using B.C.'s abundant thermal coal resources. Regulatory streamlining will allow more efficient resource development.

BC Utilities Commission. The BC Utilities Commission will be strengthened and will fulfill its mandate to protect the public interest by reviewing and approving energy rates, reliability standards and other conditions of service. The Utilities Commission Act will be updated to reflect the move to negotiated settlements and performance-based regulation. New rates will be determined for BC Hydro and the BC Hydro Transmission Corporation, as well as new rate structures for large electricity consumers. The commission will also provide regulatory oversight of the least-cost resource acquisition processes of BC Hydro, Aquila Networks Canada and other investor-owned utilities while maintaining the BC Clean goal.

B.C. taxpayers. Taxpayers will continue to receive the benefits from public investment in BC Hydro. New power development by the private sector will protect them from the financial risks of building new generation. Private power production and the development of new energy supplies (e.g., alternative power, coal-fired electricity, coalbed methane, offshore oil and gas) offers additional government revenues to help fund health care and other services.

B.C. communities. Communities will benefit from the increased economic activity from developing new energy supplies and investing in energy efficiency. Local investment will generate jobs and economic spin-offs throughout the province. The clean energy goal, measures to encourage energy saving, and strategies for reducing greenhouse gas and local air emissions will all contribute to environmental improvement in energy-producing communities.

B.C. will be better positioned for further evolution in energy markets. North American energy markets are evolving at a rapid pace. B.C. must be able to respond to these changes if we are to continue realizing the economic benefits they offer. This energy plan will encourage the development of new resources to strengthen and diversify energy supply. The result will be a flexible and robust energy sector that can respond to further market challenges and opportunities as they arise.

Energy for Our Future: A Plan for BC. Some of the actions described in this plan are already underway. Others will require time for careful planning and implementation. A public hearing on BC Hydro rates will be held by the end of 2003/04. The plan will be rolled out over the coming months, with full implementation by December 2004.

Low electricity rates and public ownership of BC Hydro

Secure, reliable supply

More private sector opportunities

Environmental responsibility and no nuclear power sources

TABLE 1: Summary of Policy Actions and Benefits

POLICY ACTIONS			BENEFITS					
	ACTION	STATUS	Low Electricity Rates	Secure, Reliable Supply	Investment Opportunities	Taxpayer Benefits	Economic Opportunities	Environmental Responsibility
7	Maintain high standards of reliability and energy security	Ongoing		✓				
12	Strengthen structure and mandate of the BC Utilities Commission	New	✓	✓				
1	Preserve low-cost generation in heritage contract	New	✓	✓			✓	
2	BC Hydro ratepayers continue to benefit from trade	Ongoing	✓				✓	
3	Maintain public ownership of BC Hydro power assets	Ongoing	✓	✓		✓		
4	Contract out BC Hydro services that save costs for customers	New	✓		✓		✓	
5	BC Utilities Commission again regulates BC Hydro rates	New	✓	✓				
6	BCUC review of Vancouver Island Generation Project	New	✓	✓				
8	BC Hydro distribution operates as a separate business from generation	New	✓	✓	✓		✓	
9	Distributors acquire least-cost resources with BCUC oversight	New	✓	✓	✓		✓	
13	Private sector develops new power, with a limited role for BC Hydro	New	✓	✓	✓	✓	✓	✓
14	Large consumers can choose supplier under new rate structure	New		✓	✓		✓	
15	BC Hydro Transmission Corp. improves access to BC Hydro transmission	New	✓	✓	✓	✓	✓	
16	BCUC determines terms and rates for BC Hydro Transmission Corporation	New	✓	✓				

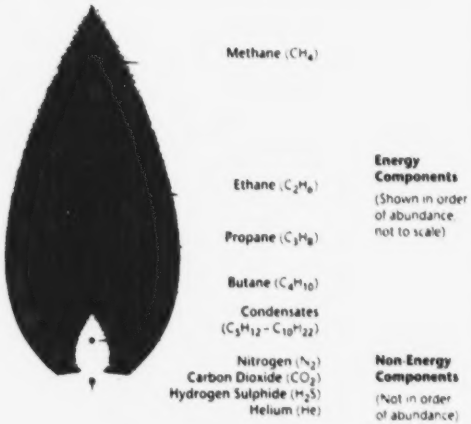
Continued

	POLICY ACTIONS		BENEFITS					
#	ACTION	STATUS	Low Electricity Rates	Secure, Reliable Supply	Investment Opportunities	Taxpayer Benefits	Economic Opportunities	Environmental Responsibility
10	Policies to encourage coalbed methane development	Ongoing/ New		✓	✓	✓	✓	
11	New offshore oil and gas team	New		✓	✓	✓	✓	
17	Ministry of Energy and Mines supports natural gas investment	Ongoing		✓	✓	✓	✓	
18	Policies to improve access to oil and gas resources	Ongoing		✓	✓	✓	✓	
19	Natural gas marketers can make direct sales to small customers	New		✓	✓			
26	Final emission standards for coal-fired power plants in B.C.	New		✓	✓	✓	✓	
20	Voluntary goal for 50% of new electricity from clean resources	New		✓	✓		✓	✓
21	New rate structures to encourage conservation and energy efficiency	New	✓	✓	✓		✓	✓
22	Update Energy Efficiency Act and improve efficiency in buildings	New		✓	✓		✓	✓
23	Remove regulatory disincentive to utility investment in energy efficiency	New	✓	✓			✓	✓
24	Strategies to manage air emissions	Ongoing/ New						✓
25	Streamlining of provincial regulatory processes	Ongoing/ New	✓	✓	✓		✓	✓

GLOSSARY

Common components of unprocessed natural gas

Natural gas is mostly methane. Methane (CH_4) is the simplest hydrocarbon molecule, with one atom of carbon and four of hydrogen.



Alternate Dispute Resolution. Processes that are alternative or complementary to traditional regulatory process such as technical workshops, issues meetings, discussion groups and negotiated settlements. Regulatory participants resolve issues outside the formal quasi-judiciary hearing process saving time and regulatory costs.

Aquila Networks Canada. With its head office in Calgary, Alberta, Aquila operates electricity distribution system in Southern and Central Alberta and provides generation, transmission and distribution services in South Central British Columbia (Kootenays and Okanagan) to 135,000 customers. Aquila, previously Utilicorp, purchased West Kootenay Power and assets from Teck Cominco.

Biomass energy. Energy derived from organic matter, such as wood residue, agricultural waste, and municipal solid waste.

Capacity. The maximum power that a generating unit, generating station, or other electrical apparatus can supply, usually expressed in megawatts.

Coal Seam. A mass of coal, occurring naturally at a particular location, that can be commercially mined.

Cogeneration. The combined production of electricity and useful heat, used for industrial, commercial, heating, or cooling purposes.

Combined cycle gas turbine. A power plant that uses the waste heat from one or more gas turbines to produce steam for conventional steam turbines, resulting in higher fuel efficiency.

Distribution. The delivery of energy to retail consumers.

Distribution system. The facilities and equipment dedicated to delivering electricity, gas, steam or water to retail customers.

Dividend. An annual payment by BC Hydro to the Province of British Columbia as its one shareholder.

Economies of scale. Characteristic of an industry where long-run average costs decline with volume of production.

Electricity. A manufactured form of energy, as opposed to naturally occurring energy resources, such as coal, oil, or natural gas. On a large scale, electricity is produced by rotating machines (generators) that operate on the principle that an electric current is generated whenever a current moves through a magnetic field.

Emission. A discharge into the air, land, or water from an industrial process, transportation vehicle, household activity, or other source.

Energy. Defined by physicists as the capacity for doing work. Energy can be produced from water, coal, natural gas, biomass and other sources.

Fuel cell. An electrochemical device that continuously converts the chemical energy of a fuel (e.g., hydrogen) and an oxidant into electric energy. Fuels cells can used to power vehicles or to generate electricity in stationary applications.

Generator. An entity that owns and operates an electricity generating plant.

Geothermal energy. Energy extracted from the earth usually in the form of steam that can be used for ground source heat pumps, water heating, or electricity generation.

Gigawatt-hour (GWh). One million kilowatt-hours.

Greenhouse gas emissions. Emissions of a greenhouse gas, such as carbon dioxide, methane, or nitrous oxide, which contribute to trapping of reradiated heat in the earth's atmosphere and warming of the planet's surface.

Grid. A network of electric power lines and connections.

Joule. An international unit of energy.

Kilowatt-hour (kWh). The amount of electrical energy produced or consumed by a one-kilowatt unit for one hour (1,000 watt hours). In B.C. the average annual residential use is about 10,000 kWh.

Landfill gas energy. Electricity produced by collecting and burning methane gas at landfill sites.

Large hydro. A hydroelectric power plant greater than 50 MW in size.

Load. The amount of electric power or energy consumed by a particular customer or group of customers.

Megawatt (MW). 1,000 kilowatts or one million watts.

Micro hydro. Hydroelectric generator with a capacity of less than 2 MW.

Municipal solid waste energy. Electricity produced by burning garbage in a boiler for steam generation.

Photovoltaic energy. Electricity produced directly from sunlight using semiconductors built into solar panels or roofing materials.

Peak demand. The maximum load consumed by a customer, group of customers, or system in a stated period of time, such as a month or year.

Power. The rate at which electric energy is delivered, measured in watts, kilowatts, megawatts, etc.

Power system. The interconnected system of facilities and equipment used by an electric utility to supply electricity to its customers. The system includes generating stations, transformers, switching stations, transmission lines, substations, distribution lines, and circuits to the customer's premises.

Renewable resources. Sources of energy that are inherently self-renewing, such as water power, solar energy, wind energy, tidal energy, geothermal energy, wood residue energy, and energy from municipal waste.

Small hydro. Run-of-river hydroelectric power plants greater than 2 MW and less than 50 MW in size. Run-of-river means that the streamflow passing through the powerhouse is basically the same as the natural streamflow, implying that there is no (or minimal) storage reservoir.

Solar energy. The radiant energy of the sun that can be converted into other forms of energy, such as heat (e.g., for water heating) or electricity.

Stepped rates. Rate structure where the unit price rises with consumption.

Terrawatt-hour (TWh). One thousand gigawatt-hours.

Thermal coal. Coal used primarily to generate heat, as opposed to metallurgical coal which is converted to coke for use in steel production.

Thermal power plant. A facility that burns fossil fuels (oil, coal, or natural gas) or uses nuclear energy to generate electricity.

Tidal energy. Electricity produced by harnessing the natural rise and fall of the tide in an estuary or bay of the ocean.

Time-of-use rates. The pricing of electricity based on its estimated cost during a particular time period.

Transmission. The transfer of electricity over power lines and related equipment to the point of transformation for distribution to retail consumers.

Transmission system. The power lines and other facilities and equipment of a power system that deliver electricity from generating facilities to the distribution system.

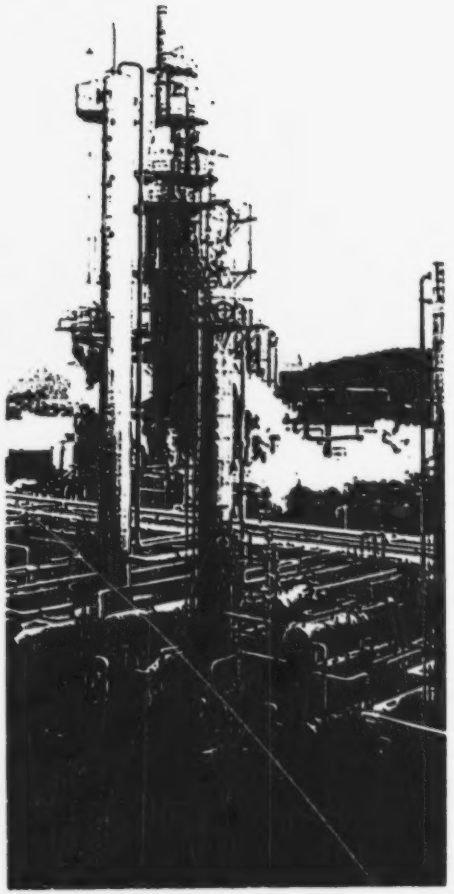
Water licence. A regulatory permit, issued by Land and Water BC, that provides for the use of a specific quantity of a provincial water resource and authority to construct associated works, such as power facilities.

Water rental. A royalty collected by the Province for the use of water.

Wave energy. Electricity produced by harnessing the natural rise and fall of waves in the ocean.

Wind energy. Electricity produced from a system of airfoils or blades that spin a drive shaft to capture the kinetic energy of the wind.

Wood residue energy. Electricity produced by burning the residues from the forest product sector in a boiler for steam generation.



APPENDIX 1: Comparison of Energy Policy Task Force Recommendations with Energy for Our Future: A Plan for BC

TASK FORCE RECOMMENDATION	ENERGY PLAN ACTION	COMMENT
4.01 Use a portion of the endowment dividend to establish a foundation that supports comprehensive research and development in conservation, efficiency and alternative energy.		*No move to market prices means there is no endowment dividend to fund a foundation.*
4.02 Set portfolio standards for renewable energy; these standards would apply to electricity distribution companies.	**Policy Action #20** Electricity distributors will pursue a voluntary goal to acquire 50 percent of new supply from BC Clean Electricity over the next 10 years.	*The energy plan builds on the task force's recommendation by broadening the definition for a portfolio standard and increasing the percentage from 30 percent to 50 percent.*
4.03 Adopt time-of-use pricing and net metering.	**Policy Action #21** New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.	*The energy plan provides a framework to pursue new rate options for conservation and energy efficiency.*
4.04 Rewrite the Energy Efficiency Act and Regulations.	**Policy Action #22** The Province will update and expand its Energy Efficiency Act, and will work with the building industry, governments, and others to improve energy efficiency in new and existing buildings.	*The energy plan adopts the task force's recommendation.*
4.05 Develop a wind project with private-sector expertise using federal funding as announced in the federal budget of December 2001.	**Policy Action #13** The private sector will develop new electricity generation, with BC Hydro restricted to improvements at existing plants.	*The energy plan provides the private sector with the framework to pursue projects.*
N/A	**Policy Action #23** The Utilities Commission Act will be amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.	*The energy plan provides regulated distributors with the tools to pursue energy conservation and efficiency.*
5.01 Develop a wholesale electricity market based on open access to the electricity transmission system. The development of this market must be consistent with market developments in Alberta and the US Pacific Northwest.	**Policy Action #1** A legislated heritage contract will preserve the benefits of BC Hydro's existing generation. **Policy Action #14** Under new rate structures, large electricity consumers will be able to choose a supplier other than the local distributor. **Policy Action #15** The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets.	*While the task force recommended the development of a wholesale electricity market in B.C., the energy plan builds on two themes: low electricity rates and high reliability and security. Low electricity rates will be assured through a legislated heritage contract. A robust market for new supply will be created providing market discipline and opportunities.*
5.02 Establish an independent transmission entity as a Crown corporation clearly separate from all generators, distribution utilities and retailers. All transmission in the province needs to be coordinated by that entity. The entity would be regulated and would: • manage transmission assets; • ensure reliability and security of the system; • administer a wholesale market; and • schedule and balance the transmission system. The establishment of an independent transmission entity would necessitate the restructuring of BC Hydro.	**Policy Action #15** The BC Hydro Transmission Corporation will improve access to the transmission system and enable IPP participation in US wholesale markets. **Policy Action #16** The BC Utilities Commission will determine the terms and rates for this new transmission entity.	*The energy plan follows the task force's recommendation with the exception that BC Hydro Transmission Corporation will not own the transmission assets. The transmission assets will remain with BC Hydro.*

Continued

5.03 Restructure BC Hydro. A new Crown corporation responsible solely for generation from the endowment assets and Burrard Thermal needs to be established. In addition, four separate regional distribution utilities need to be established. Non-core assets need to be handled in a separate entity.	**Policy Action #8** BC Hydro's distribution will operate as a separate line of business from generation.	*The energy plan does not support the creation of separate generation and distribution Crowns. Instead, lines of business for generation and distribution will be created to pursue efficiencies and complement the heritage contract noted in Policy Action #1.*
5.04 Establish Crown-owned entities on a commercial basis to resemble comparable, non-government-owned commercial enterprises.		*The energy plan follows the task force's recommendation. BC Hydro is already structured in this manner. This plan does not create numerous Crowns.*
5.05 Encourage private-sector investment in additional electricity generation in the province. This generation needs to be for both domestic and export markets.	**Policy Action #13** The private sector will develop new electricity generation with BC Hydro restricted to improvements at existing plants.	*The energy plan adopts the task force's recommendation by clarifying that the private sector will develop new electricity generation.*
5.06 Recognize Burrard Thermal as integral to British Columbia's electrical system. Burrard Thermal can be upgraded or replaced, the latter requiring lead time and significant financial resources.		*The Province will establish a Committee of Members of the Legislative Assembly to review Burrard Thermal operations and make recommendations on phasing out the existing facilities.*
5.07 Recognize Williston Reservoir's direct and valuable role in supporting electricity generation on the Peace River. The current water license for the Williston Reservoir should be respected.		*A water use plan is being developed for the Peace River system and will be brought to Cabinet for final approval. WUP is a collaborative process to change the operations of hydroelectric facilities that reflect contemporary values and scientific research.*
5.08 Establish 10-year transitional arrangements for the market pricing of generation from the Columbia and Peace River dams, referred to as the endowment, and ensure all customers receive a fair share of the endowment through a rebate. The remaining rebate is to be government revenue with a portion directed to the Foundation on Conservation, Efficiency and Alternative Energy. The Province also needs to take the following complementary policy action: • remove the Provincial Sales Tax on energy inputs for industry, a tax policy unique to British Columbia; • provide accelerated write-offs for investment in energy-saving technology; and • provide rate design incentives to promote energy efficiency by all consumers.	**Policy Action #1** A legislated heritage contract will preserve the benefits of BC Hydro's existing generation. **Policy Action#2** BC Hydro ratepayers will continue to benefit from electricity trade. **Policy Action #21** New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.	*Similar to the task force's recommendation, the energy plan has a 10-year heritage contract. However, the price will be based upon costs of production rather than set by market prices. Further, BC Hydro ratepayers will continue to benefit from electricity trade.* *The Province has eliminated the social services tax for production machinery and equipment. Further changes may be reviewed as part of the annual budget process.* *The energy plan adopts part of the task force's recommendation. Starting with large electricity consumers, a stepped rate will provide an incentive for conservation and energy efficiency. These consumers will also be able to choose a supplier other than the local distributor. Developing a similar program for other rate classes may be more complex, however, some elements may be pursued in the future.*
5.09 Eliminate the electricity rate freeze on January 1, 2003, or sooner, and institute at least a three per cent per annum rate increase for three years to provide funding for electricity infrastructure upgrades and expansion, cost of service and the foundation.	**Policy Action #5** The BC Utilities Commission will once again regulate BC Hydro rates.	*The energy plan does not adopt the task force's recommendation to prescribe a rate increase. Rather, the BC Utilities Commission will review and approve the appropriate rates.*
5.10 Ensure the move to market pricing is fully coordinated with other major policy changes underway. This is particularly important in the forest sector.		*There is no move to market pricing.*
5.11 Ensure distribution companies send strong price signals to consumers by reflecting full market prices in electricity bills.	**Policy Action #21** New rate structures will provide better price signals to large electricity consumers for conservation and energy efficiency.	*The energy plan partially adopts the task force's recommendation. Starting with large electricity consumers, a stepped rate will provide an incentive for conservation and energy efficiency.*

N/A	**Policy Action #3** Public ownership of BC Hydro's generation, transmission and distribution assets will continue.	
N/A	**Policy Action #4** BC Hydro will outsource the delivery of services where costs can be reduced for electricity consumers while maintaining quality of service.	
N/A	**Policy Action #6:** The Vancouver Island Generation Project will be reviewed by the BC Utilities Corporation to determine if it is the most cost-effective means to reliably meet Island power needs.	
N/A	**Policy Action #9 :** Electricity distributors will acquire new supply on a least-cost basis, with regulatory oversight by the BC Utilities Commission.	
6.01 Support and encourage industry to establish one or more natural gas storage facilities in or near the Lower Mainland, possibly including Vancouver Island, to serve British Columbia markets. The storage facility must be accessible to all parties selling natural gas directly to consumers and should be regulated by the BC Utilities Commission.	**Policy Action #7** High reliability and energy security will be maintained through well-functioning natural gas markets and coordinated electricity planning.	*The moratorium on drilling for underground storage will remain. The Province is confident that market participants will develop the appropriate infrastructure and price risk mitigation measures.*
6.02 Through clear, certain and proactive planning and regulation, support, encourage and facilitate timely pipeline expansion. To ensure British Columbia 's natural gas transmission system has adequate capacity to meet demand, the Task Force also recommends the following: • sound and independent supply/demand forecasts to assist regulators and the market; • investment returns that are competitive in the North American market; and • establish a clear process for the BC Utilities Commission to ensure that adequate gas supplies and transmission capacity are reserved for the domestic market to ensure these consumers have access to natural gas at reasonable, stable rates.	**Policy Action #7** High reliability and energy security will be maintained through well-functioning natural gas markets and coordinated electricity planning. **Policy Action #12** The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other energy distributors, will be strengthened. **Policy Action #17** The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years.	*The energy plan adopts most of the components of this recommendation. The Province is confident that market participants will develop the appropriate infrastructure and price risk mitigation measures.* *With a strengthened and focussed BC Utilities Commission, regulatory oversight will be in place ensuring that consumers have access to natural gas at reasonable, stable rates.*
6.03 Promote road infrastructure specifically for oil and gas. In setting road priorities, consideration should be given to the economic benefits of resource development. Tools to help develop the infrastructure include innovative public-private partnerships and fiscal measures.	**Policy Action #18** Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.	*The energy plan adopts the task force's recommendation.*
6.04 Expedite the development of pre-tenure plans in special management areas so that resource development, as envisioned in the land use planning process, can occur in a timely manner. Land-use priorities and conditions of access should be defined whether in special management areas, which require pre-tenure plans, or elsewhere.	**Policy Action #18** Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.	*The energy plan adopts the task force's recommendation.*

Continued

OIL AND NATURAL GAS		
6.05 Investigate appropriate measures for petroleum and natural gas tenure that allow for large-scale regional exploration within Interior basins.	**Policy Action #17** The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years. **Policy Action #10** Development of coalbed methane and other unconventional resources will be encouraged to provide a new source of energy supply and opportunities for regional economic development.	*The energy plan adopts the task force's recommendation.*
6.06 Undertake geoscience studies aimed at enhancing opportunities in underexplored petroleum regions, such as the Interior basins, and identify underexplored or new petroleum resources for development in established regions within Northeast British Columbia.	**Policy Action #17** The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years.	*The Ministry of Energy and Mines adopts the task force's recommendation and will undertake geoscience studies.*
6.07 Develop royalty regimes for new resource opportunities such as tight gas and Interior basins.	**Policy Action #17** The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years. **Policy Action #10** Development of coalbed methane and other unconventional resources development will be encouraged to provide a new source of energy supply and opportunities for regional economic development.	*As part of the Province's commitment to provide support for continued industry investment in natural gas production, new royalty regimes will be explored.*
6.08 Create a system of royalty credits to encourage investment in high-cost and high-risk new resources.	**Policy Action #17** The Ministry of Energy and Mines will provide support for continued industry investment in natural gas production over the next 10 years. **Policy Action #10** Development of coalbed methane and other unconventional resources development will be encouraged to provide a new source of energy supply and opportunities for regional economic development.	*A new coalbed methane royalty is already in place. As part of the Province's commitment to provide support for continued industry investment in natural gas production, new royalty regimes for conventional and unconventional resources are being explored.*
6.09 Insist that the federal government lives up to its commitment under the Northern Pipeline Act to consult with the province and that the two jurisdictions work to facilitate passage of the pipeline through British Columbia to maximize benefits for the people of the province.		*The Province is confident that market participants will develop the appropriate infrastructure. The Province will work with other levels of government and industry for the benefit of the province.*
6.10 Establish flaring standards for both test flaring and ongoing flaring for operational purposes.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.	*The Oil and Gas Commission and the Ministry of Water, Land and Air Protection are in discussions on transferring the responsibility to the Oil and Gas Commission under the Oil and Gas Waste regulation.*
6.11 Promote acid-gas re-injection as the preferred method for handling waste-gas production by developing appropriate regulatory and fiscal regimes to ensure this becomes the method of choice for the industry.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.	*B.C.'s strategies to manage greenhouse gas and other emissions will look at numerous alternatives, including acid-gas re-injection.*
6.12 Evaluate the potential and technical feasibility for large-scale greenhouse-gas (carbon dioxide) sequestration or subsurface waste-gas disposal in regions likely to require these technologies.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.	*B.C.'s strategies to manage greenhouse gas and other emissions will look at numerous alternatives, including sequestration.*
6.13 Insist that the federal government engage in serious discussions on treaty-related issues.		*The Province is already engaged with the federal government in discussions on treaty-related issues.*
6.14 Work with industry to find creative means to engage First Nations in the development of energy in the province.		*The Province is already working with industry to find creative means to engage First Nations in the development of energy in the province.*

Appendix 1 - 35

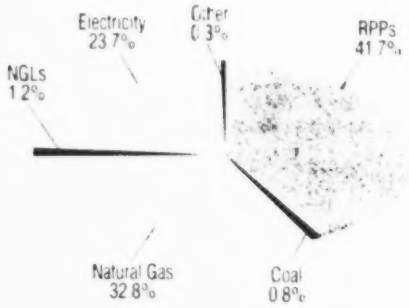
6.15 Support and encourage increased customer choice of provider and offerings for all natural gas customers and, particularly, residential and small commercial customers.	**Policy Action #19** Natural gas marketers will be allowed to sell directly to small customers, and will be licensed to provide consumer protection.	*The energy plan adopts the task force's recommendation.*
6.16 Eliminate the requirement for Energy Removal Certificates in order to streamline the regulatory approval process and avoid duplication of National Energy Board functions.		*Energy Removal Certificates will be eliminated as part of government's New Era commitment to reduce unnecessary red tape and regulation by one third within three years.*
N/A	**Policy Action #11** The Ministry of Energy and Mines will establish a dedicated provincial offshore oil and gas team to a develop a provincial position, work with the federal government and move effectively toward development of the offshore resources.	*The energy plan addresses offshore oil and gas exploration and development. The task force concluded that this was not part of it's terms of reference.*
7.01 Review best practices, including the application of new coal technology to meet environmental standards and encourage pilot projects by industry.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds. **Policy Action #26** To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.	*The energy plan adopts the task force's recommendation regarding emission guidelines for coal-fired power plants.*
7.02 Finalize emission guidelines for coal generating plants with stakeholders as soon as possible. As any provincial guideline may be superseded by federal requirements, relevant inter-governmental discussions need to be undertaken.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds. **Policy Action #26** To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.	*The energy plan adopts the task force's recommendation.*
7.03 Develop guidelines on boiler emission standards.	**Policy Action #24** The government is developing strategies to manage B.C.'s greenhouse gas emissions and air quality in threatened airsheds.	*The energy plan adopts the task force's recommendation.* *The Ministry of Water, Land and Air Protection has launched a broad review of the 20-year-old Waste Management Act. The review process will take approximately 18 months to complete.*
7.04 Ensure that applications for permits are dealt with in a timely manner and that review processes are transparent and efficient. Impose timelines for the permitting process and review public consultation and appeal provisions to ensure that the public interest is adequately protected.	**Policy Action #25** Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.	*The Ministry of Water, Land and Air Protection has launched a broad review of the 20-year-old Waste Management Act. The review process will take approximately 18 months to complete. A reformed Environmental Assessment process encourages concurrent permitting.*
7.05 Review current environmental assessment processes to ensure coal is treated consistently with other energy sources.	**Policy Action #25** Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined.	*A reformed environmental assessment legislation was introduced in the spring 2002 session of the Legislature and will be brought into force by the end of 2002.*
8.01 Strengthen the capacity of the Ministry of Energy and Mines to play the lead role in energy policy formulation and implementation in the province.		*The ministry's service plan includes performance measures to implement the energy policy.*

Continued

8.02 Ensure the Ministry of Sustainable Resource Management makes energy a priority in its pre-tenure planning activity.	**Policy Action #18** Pre-tenure and land use planning, as well as northern road improvements, are improving access to oil and gas resources.	*The Ministry of Sustainable Resource Management recently approved the Besa-Prophet pre-tenure plan for the exploration of natural gas deposits estimated to have a value of $2 billion.*
8.03 Ensure the Ministry of Water, Land and Air Protection provides clear standards on energy emissions from all sources.	**Policy Action #25** Provincial processes for environmental assessment, water licensing and waste permitting are being streamlined. **Policy Action #26** To allow for a fair evaluation of coal-fired electricity projects, final emission standards will be adopted for coal-fired power plants.	*The Ministry of Water, Land and Air Protection has launched a broad review of the 20-year-old Waste Management Act.* *The review process, which will take approximately 18 months to complete.* *The Ministry of Water, Land and Air Protection will adopt guidelines for coal-fired power plants by January 1, 2003.*
8.04 Strengthen the BC Utilities Commission, a key regulatory agency for energy in the province. This requires significant changes to regulatory practice, with a much greater reliance on a results- based and performance-based regulatory framework. A complete rewrite of the BC Utilities Commission Act is required.	**The Policy Action #12** The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other energy distributors, will be strengthened. **Policy Action #5** The BC Utilities Commission will once again regulate BC Hydro rates.	*The energy plan adopts the task force's recommendation. The Utilities Commission Act will be updated and amended as needed to implement the plan.*
8.05 Strengthen the B.C. Oil and Gas Commission and use it as a model for developing a single-window-permitting agency for energy.		*The B.C. Oil and Gas Commission's service plan has identified a number of initiatives to develop a single-window-permitting agency for 95% of the oil and natural gas sectors permitting requirements.*
8.06 Strengthen the BC Environmental Assessment Office and review process. This requires greater results-based practice. It also requires greater harmonization of process with the federal government and this should be accomplished by improving the Canada-British Columbia Agreement for Environment Assessment Cooperation that is currently under negotiation.	**Policy Action #25** Provincial processes for environmental assessment, water licensing, and waste permitting are being streamlined.	*Reformed environmental assessment legislation was introduced in the spring 2002 session of the Legislature and will be promulgated by the end of 2002.*
8.07 Resolve the difficulties investors are having with the Department of Fisheries and Oceans. This will require joint federal/provincial action at the highest levels.		*The B.C. Oil and Gas Commission has developed a strategy to establish a close working relationship with the Department of Fisheries and Oceans.*
8.08 Provide provincial standards for air emissions and thereby avoid duplication and confusion at the local level.	**Policy Action #25** Provincial processes for environmental assessment, water licensing, and waste permitting are being streamlined.	*The Ministry of Water, Land and Air Protection has launched a broad review of the 20-year-old Waste Management Act. The review process, which will take approximately 18 months to complete.*
8.09 Encourage regulators to undertake greater public dialogue and debate with stakeholders and consumers, recognizing that education is the best means to facilitate energy conservation and consumer choice.	**The Policy Action #12** The structure of the BC Utilities Commission, and its mandate in regulating BC Hydro and other energy distributors, will be strengthened.	*The energy plan adopts the task force's recommendation.*

APPENDIX 2: B.C. Energy Snapshot

ENERGY CONSUMPTION BY FUEL - 2000



GEOGRAPHIC CONTEXT

The majority of B.C.'s current energy supplies are located in the Northeast and Southeast. Oil and natural gas production presently comes from a portion of the Western Canada Sedimentary Basin that extends into northeastern B.C. There are unexplored basins in the Interior and Northwest, on Vancouver Island, and offshore. Recently, very large unproven natural gas reserves, methane hydrates, were reported off western Vancouver Island.

Hydroelectric resources are concentrated on the Peace River in northeastern B.C. and the Columbia River in the southern Interior. Other hydroelectric and thermal power plants are located in the Lower Mainland and on Vancouver Island and the Mid-coast. Some potential alternative energy resources are more focused in coastal areas (e.g., tidal and wind), while others, such as small hydro and wood residue, are scattered throughout B.C.

The province's richest coal deposits are found in the Rocky Mountains in its extreme southeast corner. Additional production occurs in the Northeast and on Vancouver Island, with a promising coalfield (Hat Creek) in central B.C. Coalbed methane deposits have been identified in the Northeast, Southeast, Interior and on Vancouver Island.

Many of our resources are located far from provincial demand centres and export markets. This means long distances over rugged terrain for high-voltage power lines, oil and gas pipelines and rail shipments of coal.

B.C. SUPPLY

B.C. is a major producer of coal, natural gas, hydroelectricity, and oil. While electricity represents approximately 38 percent of the value of the energy sector, it makes up only 11 percent of total primary energy production. Most (80 percent) of the energy produced comes from coal and natural gas, due to B.C.'s endowment of these resources.

An extensive energy production network comprises more than 100 power plants, over 3,700 producing oil and gas wells, 29 gas processing plants, two petroleum refineries, and eight coal mines. There are 18,000 kilometres of power transmission lines, 300 substations, and 80,000 hectares of right-of-way involved in bringing B.C. electricity to market. Approximately 24,000 km of gas-gathering and transmission lines connect natural gas producers and provincial consumers. Another 2,500 km of pipelines carry oil and natural gas liquids to refining facilities within and outside the province.

B.C. CONSUMPTION

Refined petroleum products (RPPs), such as gasoline, diesel, and heating oil, account for the largest share (42%) of B.C. energy consumption followed by natural gas and electricity. Most of these RPPs are used in transportation, which makes up 37 percent of total energy consumption and is one of the fastest growing consuming sectors. The industrial sector, on the other hand, accounts for the largest share of natural gas (44%) and electricity (49%) consumed, reflecting the energy intensity of BC industry. Although coal represents about 46 percent of primary energy produced, very little of that production is consumed in BC.

TRADE AND CONNECTIONS

B.C. exports energy to markets in Canada, the US, Asia, Europe, and Central and South America. Virtually all coal produced is destined for outside markets, while about 55 percent of natural gas is exported. Although BC Hydro is generally in demand/supply balance, it becomes a net exporter of electricity during high water inflow years. A net energy exporter overall, B.C also imports refined petroleum products and, at times, electricity as part of our trading activities.

The Duke Energy natural gas pipeline connects with the US Pacific Northwest at Sumas, Washington. Among other facilities, the Alliance Pipeline delivers natural gas to the US Midwest and the Southern Crossing Pipeline brings Alberta gas to the Interior. BC Hydro's transmission interconnections with the US provide a transfer capacity of 1,230 to 3,150 MW south and 2,000 MW north. The Alberta links can deliver 400 to 800 MW east and up to 700 MW west.

B.C. utilities participate in US and Alberta wholesale power markets. They do so to take advantage of lower cost electricity, augment their generation during low water inflow years, and sell any surplus energy. BC Hydro has developed an active trading business in these markets by using its flexible hydroelectric plants and an ability to time water releases from reservoirs. By reducing electricity production from dams and importing electricity during low price periods, it can increase production and export during high price periods, while still meeting domestic needs.

INDUSTRY STRUCTURE

BC Hydro, a provincial Crown corporation, owns and operates 80 percent of BC's 14,000 MW of dependable generating capacity. It accounts for more than 90 percent of annual electricity production. The balance is divided among Columbia Power Corporation, Aquila Networks Canada, Alcan, Teck Cominco Limited, self-generators, and independent power producers. Another eight municipal utilities purchase from Aquila Networks Canada and BC Hydro and distribute power in their local areas. Other investor-owned utilities include Hemlock Valley Electrical Services, Princeton Light and Power, Yoho Power and Yukon Electrical Company.

Private ownership characterizes fossil fuel industries. About 200 oil and gas companies and about half a dozen of coal companies presently operate in the province. Duke Energy Corporation (formerly Westcoast Energy Inc.) owns and operates the major natural gas pipeline from the Northeast to Vancouver. Three distribution utilities - BC Gas, Centra Gas and Pacific Northern Gas - and various gas marketers and brokers deliver natural gas to provincial consumers.

REGULATION

The BC Utilities Commission regulates energy utilities and reviews and approves rates and new facilities. BC Hydro was effectively taken out of BC Utilities Commission regulations as a result of the rate freeze in 1996 and ministerial exemptions of BC Hydro's projects.

Provincial and federal environmental assessment processes are used to review major energy development projects. The National Energy Board (NEB) regulates energy exports, while the Department of Fisheries and Oceans has jurisdiction over fish and fish habitat in the ocean and some inland waters. The B.C. Oil and Gas Commission regulates all oil and gas activities, including exploration and development, production, processing and storage.

Energy policy is the responsibility of the Ministry of Energy and Mines, which also has a role in government's direction to BC Hydro. The Ministry of Water, Land and Air Protection sets requirements for water quality, waste management (including air emissions) and wildlife, while the Ministry of Sustainable Resource Management oversees land and water use management and pre-tenure planning. The Greater Vancouver Regional District also has delegated authority for air emissions permitting and other environmental matters. In addition, local governments influence the siting of energy facilities through official community plans and zoning bylaws.

PRICING

For all energy production other than electricity, prices are determined in regional (natural gas) or international (oil and coal) commodity markets. The NEB regulates rates for interprovincial and international pipelines. Instead of traditional cost-of-service regulation, it now encourages the use of negotiated settlements among the parties involved.

The BC Utilities Commission regulates rates for natural gas distribution and electricity to ensure that they are just and reasonable and do not discriminate between customers Regulated utility rates blend the cost of new with existing energy supplies. Most rates are flat, charging the same price per unit of energy no matter how much consumers use. They are also postage stamp, so that the price does not vary from one location to another.